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The AMERICAN RIFLEMAN

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A Sermon On the Mount

By "The Archbishop"

EVERY manufacturer of that form of small arm known as the rifle at one time or another attempts to place before the very exacting clan of enthusiasts known as "rifle nuts" a super-accurate type of arm. You will observe that I qualify the effort because in the minds of many of these so-called rifle "sharks" or "nuts" the effort would appear to be a failure, the unfortunate manufacturer in many instances coming to the same conclusion himself, although he certainly believed himself well qualified from every angle of the business at the outset.

At the present time the two most popular rifles in this country are those chambered for the Model 1906 cartridge, which is a caliber-.30 affair, and the little caliber-.22 long-rifle rim-fire. In the main these weapons are utilized for target practice, with hunting as a side issue.

These two types of weapons are as a general rule entirly fabricated within the parent plant, and proofed and tested with exceeding care. There are, of course, many very excellent barrelmakers, and it is becoming quite a fad to resort to barrels other than the original one placed upon the action. This particularly is so with the caliber-.22 match type rifle.

Since the introduction of the Winchester Model 52 and the Springfield M1 rifles, both of which are caliber-.22 rifles, primarily of the target class, the need for special barrels on these actions (they are both of the bolt-action type) has seemed to me in the main rather rediculous, although I have myself run the gamut of this situation only to return to the original design eventually.

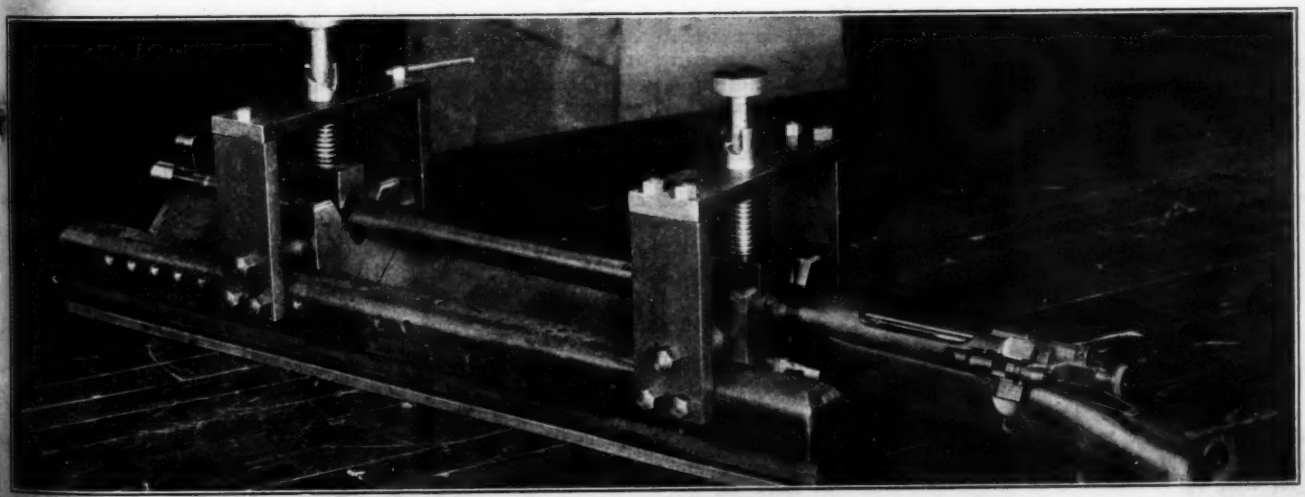
Based upon our remarkable service rifle, the Model 1903, which as we all know is .30 caliber, there has gradually been developed a decided type of match weapon having a quite heavy, massive barrel. These weapons in the main employ the Model of 1903 (Springfield) action, while the barrels may or may not be of Springfield Armory manufacture, Winchester and Remington making splendid barrels which they attach themselves at their works with consummate skill.

Now it is my contention that, other things being equal, a good rifle is only good so long as the amunition is worthy of that name. Modern methods, material, skill and knowledge all tend to produce remarkably uniform rifles. There is, of course, that something known as the "art of small-arms manufacture"—that intangible spirit passed down from generation to generation in certain of our well-known armories which does tremendously add to the nicety and care in fabrication, assembly and testing. I believe this spirit to be very dominant at Springfield Armory, perhaps more so than at any other arms establishment in this country.

A rifle is a form of gas-engine. When the cartridge is fired the piston, in the form of the bullet, travels forward, while various complex stresses and vibrations are set up within the barrel and action. These reactions to the explosion of the powder, particularly as the power of the cartridge increases, have a marked bearing upon the accuracy of the rifle. If the barrel is too light it vibrates excessively, and every shot is unduly influenced by this vibration. And when these very light barrels are longer than is now the general custom their behavior is quite likely to be astounding, to say the very least.

In caliber-.22 barrels the question of vibrations is not so vital, although unquestionably vibration occurs in these barrels to some extent.

Now the reason for the heavy match barrel of modern times came about largely because it was found that these massive tubes were not only very steady performers with various types of full-power ammuni-



One Form of Machine Rest With 24-inch .30 Caliber Match Barrel In Place

tion—we are speaking now of caliber-.30 ammunition primarily—but were also for a reasonable number of shots very steady pointers, while recoil was considerably reduced. Of course their very thickness tended to dampen vibrations greatly, besides keeping down the temperature. It is not difficult, therefore, to understand why the heavy barrel when accurately made can not be otherwise than a very dependable performer. With such barrels I have seen targets made at 200 yards with quite ordinary ammunition that were really very good, while this same ammunition in light-type barrels employing the same action was far from satisfactory. This is due primarily to the great rigidity of the heavy barrel in which variations in muzzle velocity did not play the havoc that later on existed when the light tube was employed.

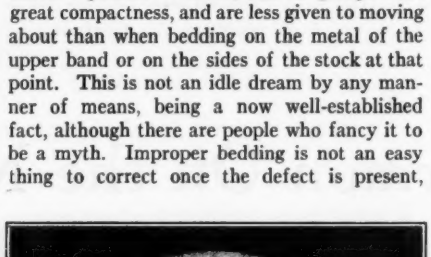
With the caliber-.22 rifle we employ the heavy barrel primarily as an aid to steady holding, although it is contended by many, and with some justification, perhaps, that the heavy barrel is a much more steady performer even in this small caliber. I have myself gone into this to great extent, but when all is said and done I have really been unable to discover whether or not it is so. In other words, I am unable to discover wherein the M1 Springfield barrel of 3½ pounds is more unsteady than one weighing 7 pounds, or even more than this; that is, as far as the shooting qualities of the two types of tubes are concerned.

However, a certain peace of mind must exist with the rifleman ere he can do his best; and if his mind is made up that 7 or 8 pounds of steel barrel is the thing, he won't do as well with 3½ pounds. Of course for very special work—such, for instance, as "free-rifle" work—it is quite important that we have a heavy tube, particularly in the offhand position, as the movements of such a barrel are less violent, less influenced by body tremors and the like. A certain ponderousness is here essential.

The bedding or stocking of a rifle, particularly that type of piece firing the powderful Model 1906 caliber-.30 cartridge, is a very important one, especially if the weapon has what we call a light type of barrel. With the heavy match type of tubes I do not believe it is so important, although I used to think so, but with barrels of 3½ pounds or so I consider that it is. The British have gone into this very carefully and have unquestioned data bearing upon it, as has our own Ordnance Department with regard to our admirable service rifle. The amount of trouble that is taken with National Match rifles to bring about what is deemed to be satisfactory in this respect would quite surprise the average rifleman, wise as he thinks he is.

With a full-stocked rifle such as our service rifle, for instance, it is very difficult indeed positively to assure this nice adjustment of forward bearing on the bottom of the wood of the stock at the upper band under all sorts of climatic conditions. This is a problem long known to the wise and intelligent marksman. It is a constant source of worry to the manufacturer, and is besides quite an item of expense in the manufacture of first-quality rifles of the service type. All this is not, of course, essential in time of war, but it is exceedingly important in the target type of rifle firing a powerful and accurate cartridge such as our Model 1906 M1 round.

It has been found that barrels that bed on the wood with some degree of firmness, say about 5 pounds or more, deliver groups with great compactness, and are less given to moving about than when bedding on the metal of the upper band or on the sides of the stock at that point. This is not an idle dream by any manner of means, being a now well-established fact, although there are people who fancy it to be a myth. Improper bedding is not an easy thing to correct once the defect is present,



A Target Made At 32.8 Yards With a Rifle Similar To the One Shown In the Rest

and I would advise that the correction be made only by a person well versed in dealing with such matters, or the attempted cure will be even worse than the original ailment. During the National Matches at Camp Perry the Ordnance Department maintains there a department whose object is primarily to keep in the pink of condition all small arms manufactured by them; and it would be profitable to look into the methods followed to correct such an ailment if it arises.

The writer in 1925 carried out tests in collaboration with Mr. Woodward, engineer of tests at Springfield Armory, wherein a method of bedding the barrel at the lower band was gone into to some extent. These tests were very encouraging and produced fine shooting rifles, the accuracy being of a very high order indeed. Four N. M. rifles which failed to target with the stocks as regularly bedded after the most painstaking efforts on the part of the assembling and stocking department, were then freed at the upper band, both metal and wood, so that the barrels were touching nowhere by a good margin. Then a narrow strip of wood packing was placed in the stock and hand-guard at the point where the lower band surrounds the stock, and the weapon then assembled, the stock and hand-guard being tightly compressed by the lower band. This method of bedding caused the barrel to float free at the muzzle and simulated the carbine or sporting type of barrel mounting. The idea in mind was that form of mounting which would combat more perfectly the undue warping of the stocks and produce uniform shooting without tinkering at the time of manufacture, or later on by the rifleman, perhaps. This scheme is not original, as the British have used it from time to time in their short rifle with success; but I believe it had not, up to our trials, been attempted before by Springfield Armory. The objection raised at the time to the scheme was that rapid fire would char the packing, but drastic rapid firing did not do so. Well, the rifles were tested in their mechanical cradle rest at 200 meters, with the following results:

M. R. Extreme vertical, inches	*Extreme horizontal, inches*
.93	1.8	2.8
1.15	2.7	3.0
1.02	3.2	1.9
.99	2.1	2.7

There were four groups of 10 shots each, M1 ammunition being employed. The rifles shot in without any preliminary firing, and were dead zero for elevation and deflection. This is very steady and compact shooting from a light barrel, and is in fact quite up to the heavy Mann type of barrel. However, the scheme was filed away on grounds somewhat similar to those often followed by the medical profession when a new remedy is brought forward as a cure. I will admit that it is just as well to be conservative in the doctoring of the ills of the armament profession as it is in the doctoring of the human machine; but by the same token there have been some very admirable advance steps propounded and found desirable which have become hoary with age just because of this seeming fear of trying anything once lest it upset a proven method known to be good although requiring somewhat greater attention to details.

What I do wish to convey in this matter of bedding the light barrel, particularly in the long military stock, is that it should assume the same relative position from shot to shot; and it is far better that it either rest with some degree of firmness on the bottom of the wood of the stock at the upper band, or float entirely free at that point. It is the jump of the barrel or movement in the vertical that we must humor, and if this is unduly interfered with at the muzzle by a side bearing we can expect the introduction of errors in delivery sooner or later. I have, however, observed some weapons that seemingly were not so influenced; but these are merely the exception that proves the rule.

It is well that the rifleman protect his stock from undue wetting. When the pieces are delivered to the shooters at the National Matches they are as perfect as human skill can make them. Careless handling during the competitions, or general dumb treatment, is bound to score adversely for the user.

It has been my observation that the short-stocked or sporting fore-end form of mounting is a most steady performer under all conditions. Certainly this form of stocking does produce most uniform targets from machine-rest. It is true that the barrels of the Model 1903 Sporter and the caliber-.22 M1 rifle are about ¼ of a pound heavier than the service-

rifle barrel, and perhaps this has a tendency to stiffen somewhat the barrel; but I am inclined to believe that the fine performance of these rifles is due more to the form of stocking than to anything else.

As a rule these fine barrels are wedged or sprung into position in the groove of the fore-end by the metal band that surrounds the stock, although I have tested many that were not so mounted and they shot equally well.

A very secure attachment must exist between the stock and the action. *This is all important* in any rifle, and particularly is it so of the one-piece stock, and when firing heavy charges. A stock that chucks fore and aft is a disgrace to the name of the manufacturer, and a snare and a delusion to the rifleman. Such stocking does not improve with use, and the barrel has no chance at all. It is surprising how few private stockers realize this. The recoil lug, or shoulder, of the receiver should bear snugly against its seat in the stock; and the guard screws should always be very tight.

The adjustment of the trigger pull is the one great problem of the Mauser action; and in the main this is the action American riflemen are now mostly concerned with. For years there has raged the battle of the trigger pull, or let-off—call it what you will. It still rages, for there is no known positive method or set of rules that will apply in every instance when it comes to adjusting this let-off. I have tried to improve pulls myself, but as a general thing have miserably failed and had to turn the job over to a skilled artisan who does this work and nothing else. If one stops to realize the hang or set-up of the trigger mechanism of the modern bolt-action arm, primarily the Mauser design, he can readily see, I believe, that adjustment of the trigger pull does not entirely depend upon the nicety of the contact surfaces of the sear and sear-notch. The fit of the bolt in the receiver, the fit of the sleeve in the barrel of the bolt, the fit of the sleeve in the receiver, the tension of the mainspring and sear-spring, the fit of the trigger within the sear, etc.—all these things play an important part in trigger action; and it is my opinion that they should be dealt with by the manufacturer in connection with the original designing as well as the manufacture of the rifle.

If the purchaser of a new rifle be informed by a skilled rifleman that the trigger on the new gun is not satisfactory, then he should return the weapon to the maker and have it readjusted, unless, mayhap, there is near at hand a very skilled gunsmith in metal who really does know his trade. It is a delicate and trying job to adjust a trigger, as I know full well. But I consider that this whole thing has been entirely and utterly overdone; and that too much stress, main strength and slight of hand has been resorted to in order to prove that the trigger pull is rotten on our service action. A form of let-off can be easily placed in our military Springfield action that kicks off the sear after a certain pressure has been applied, somewhat on the plan of a set trigger; and that is perfectly safe, simple and rugged. And it is my firm conviction that until this form of trigger mechanism is introduced we can not expect a watchmaker's job. Lay off of trigger adjustment on your Springfield actions unless you have extra sears and cocking-pieces. The hard contact-surfaces are not hard clear through to China; and it is very easy to rip the tough skin of the case off, and then you may as well have a rubber sear and trigger. Beware of the trigger crank—his home is in the asylum for incurables. From the foregoing I do not wish it understood that any old pull should go. Far from it. But I contend that the thing has become an obsession to a point where no matter what the manufacturer does it is considered good form to spend part of one's time on the firing-line piddling away with file and whetstone, the meanwhile orating on the art of making two contact-surfaces break when the brain says "go."

Let us now consider the movable base of the rear sight. There are times when some play exists between the worm gear and the movable base; also a bit of up-and-down motion. In order to remove this play you had better go slow and let the arsenal mechanics do their part if you are at Perry. It will be found that this trouble has virtually passed away, although there are times when it still will crop up, unfortunately. The movable base should swing with freedom when the worm is removed. If it does not then it must be ascertained where the friction occurs, and with great care this must be reduced with a fine file or oil-stone. If the up-and-down motion is unduly excessive (some will exist always) the movable base must be slightly bowed by striking the bottom of movable base in its center when the base is supported at each end on thin strips of metal. This is a delicate job, but if skillfully performed it will produce just that right tension at pivot point and rear bearing at base of groove in fixed base. There is a little spring affixed to the worm, which is placed there to keep the worm up to its work and prevent backlash. If the movable base does not recover when pushed against this spring it is time to investigate; otherwise I advise you to refrain entirely from tinkering.

Ignition is one of the salient points in accuracy. Its influence is less apparent with powerful ammunition but is there just the same; and in the exacting work of testing out a new super-accurate ammunition it can be observed. However, it is with the .22-caliber that it appears in a startling manner. I believe this point is better able of solution by the makers of our standard match quality small-bore rifles than by the many admirable private makers of barrels who now infest our land. Some actions lend themselves admirably to a correction of this defect, provided the mainspring is at fault, as it quite often is. The Winchester .52, the M1 Springfield and the B. S. A. No. 21 Martini can quite easily have substitued stronger mainsprings, particularly the last two weapons named. I remember last year at Sea Girt of correcting two rifles, one a Springfield and the other a B. S. A.; and in each instance the improvement was most marked and satisfactory. Neither owner suspected what the trouble was.

I have a most remarkable little B. S. A. Springfield caliber .22 l. r. match rifle, which with its original mainspring is a very ordinary shooter, but with its special alloy steel mainspring of square section is one of the most beautiful little performers I have ever observed; and this, too, with several makes of ammunition. It is uncanny and intensely interesting how this little piece will respond to a suitable tension of spring. This little rifle will group into ¾ of an inch at 50 yards, and 50 per cent of the time better than this; and it will do this, too, for hundreds and hundreds of shots without cleaning. But with the original spring it does well if it keeps within a 1½-inch circle—and there you are!—this of course from a machine-rest. A similar rifle, the property of my good friend Russel Wiles, of Chicago, acts in the same manner; and Wiles can play a nice tune or a very bad one by the simple expedient of swapping mainsprings. Both these admirable little pieces have M1 Springfield barrels of regular run, the weapons being fitted, chambered and stocked by that splendid artisan of the craft, Seymour Griffin, of New York. Wiles' rifle has a section of a Springfield service rifle mainspring, while mine has a spring made for me by John Garand, the wizard of Springfield Armory, inventor of the famous Garand Semi-Automatic service rifle.

Again, I have another .22-caliber match rifle of the straight M1 persuasion, which with one bolt is a very excellent performer indeed but with another bolt is just about the nicest thing one could wish for. In the latter instance this would clearly indicate that it is not well to swap bolts; and it is for this reason that Springfield now numbers all bolts with the serial number of the rifle.

The location, form and depth of indentation of striker play an important part in ignition. With some makes of rifles this may amount to ruptures with a certain manufacture of ammunition, and with still another manufacture nothing of the sort takes place.

I have often observed that ruptures at times have slight influence upon the grouping of a rifle, the shot from the ruptured round going directly into the group, and doing so regularly; but this is poison to the action, striker hole and point of striker, quickly eroding the hardest steel and rapidly destroying the fine surfaces.

Head space is also a very important point. It is here that the Winchester .52, Springfield M1 and B. S. A. No. 12, when properly refitted, excel. The Ballard action when correctly barreled is also splendid. This point is receiving much closer attention than of old. The bolt-actions are really supreme in this respect, and maintain this fine fit indefinitely. I believe that the Springfield M1 rifle is beyond a doubt the most perfectly breeched .22-caliber rifle in the world. Measurements carried out by the arsenal indicate that a closer tolerance is adhered to at this point than obtains anywhere else on a commercial scale and in most instances this is quite beyond the results attempted by small shops.

Uniformity in barrel measurements, bullet seat and chamber are of course essential for uniform results. However, a barrel may indicate that it is somewhat larger in the bore than specifications call for and still perform

beautifully. I no longer pay as much attention to this as of yore; but I do not look with favor upon a choked bore, nor do I have much confidence in the loose chamber.

Smokeless powder is about to become a strong competitor of Lesmok in the little .22 long rifle. Certain remarkable strides in the chemistry of primer manufacture have, in conjunction with smokeless powder, brought before the rifle clan the undoubted fact that corrosion, the deadly enemy of the rifle, is no longer of serious moment. Of course not all smokeless loadings for the .22 have this remarkable property, but it will not take the discerning rifleman long to find this out. The very fact that smokeless powder is a necessary adjunct to this latest discovery will bring about, if it is not actually here, an intense activity on the part of the manufacturers to produce super-accurate stuff. Fouling has always been the bane of the .22 marksman. It was this that caused Lesmok to become the standard propellant, or at least this was one of the potent reasons. I believe that much of the weird shooting at times experienced by our small-bore marksmen can be attributed to this fouling. For days we will perform with great regularity, be it from the shoulder or machine rest; and then for a time all is pitiful and hopeless. Lubrication appears of little avail at such periods. Atmospheric conditions undoubtedly play a very important rôle in this respect, a certain balance in the moisture content of the air being necessary to bring about the regularity we demand. Now, smokeless powder does not foul the bore in the fashion Lesmok does; and tests of the very latest loading indicate a degree of regularity in dispersion quite unusual even for the finest Lesmok combinations fired over a period of days or weeks. I do not wish it understood that I yet consider smokeless powder as accurate as Lesmok for small-bore work. But I believe it soon will be; and when that is so we will have produced something worth while. Rather tight bores and chambers favor smokeless powder in the little rifles, tight breeching and well-tuned ignition also being essential. These characteristics are well carried out in the latest Government small-bore rifles, I might remark. It will be intensely interesting to watch this latest trend because our preconceived ideas of smokeless powder in this little cartridge are about to be swept away entirely.

The question, what is the most accurate barrel length, always interests the rifleman. With the .22 it is not essential that we extend this length much if any beyond 24 inches except for reasons of balance or hang. Iron sights should of course have ample radius, as anyone interested in the subject can readily see for himself if he cares to plot the error of a hold, say 1/100 of an inch, with a sight radius of 26 inches, against the error with a radius of 36 inches. Cold, unvarnished field experience indicates that quite a difference may exist, but you can not discover that it amounts to a handicap at all. The telescopic sight, on the other hand, entirely ignores barrel length, for this beautiful system of sighting works as well on a barrel 18 inches long as on one twice that length. It is perhaps due to the American rifleman's penchant for the scope-sight that we see so many compact, short-barreled weapons on the ranges of late years. The truth of the matter is that somewhat greater velocity with Lesmok powder obtains, although it is comparatively slight, with barrels from about 24 inches down to about 18 inches in length than exists above the greater of these two lengths. I have no doubt that many barrels of the 30-inch persuasion or even an inch or two less would perform with greater regularity were the owner to remove some inches or so from their length. After a certain length has been reached any increase has no real ballistic advantage, and may in truth be somewhat of a disadvantage.

In the .30-caliber this question of barrel length has been gone into with considerable thoroughness by the Ordnance Department. Very prolonged firings certainly demonstrated that 24 inches by all odds produced the most uniform results—that is, the targets produced by the 24-inch barrels maintained a finer balance between extremes than existed with lengths greater than this. Of course there were some astounding targets in all the lengths tested or experimented with, and all groups were fine; but all the 24-inch barrels were steady performers, while some of the other lengths were not entirely so.

The subject is a very interesting one to me and I have done a bit of experimenting along this line myself, taking a very fine match barrel of 28 inches and cutting off an inch at a time till 24 inches was reached. Velocity and accuracy firings were made at each stage, but aside from a falling off in velocity of about 25 foot-seconds for each inch removed no startling differences were noted. Various powders and grades of bullets were employed, and powder charges, too. An interesting difference was noted as between single-base and double-base powders as the barrel shortened up. One can never get very far with one barrel, and I realized this; but I wished to see for myself certain things, and whether others would perhaps disclose themselves, and willingly sacrificed the poor barrel to the cause of a rifle crank's curiosity.

The high lights of this little test would indicate that with this particular barrel the lengths 27 and 26 inches were the best, that 28 inches, the original length, was the worst, and that 25 and 24 inches were just about alike. The figures follow and are the mean of the figures of merit at 300 meters, the weapon being fired of course from a machine rest:

28 inches	27 inches	26 inches	25 inches	24 inches
3.37	2.54	2.74	3.06	3.20

Over a thousand rounds were fired in groups of 10 shots each. From the above it appears that 27 inches gave the best results, followed closely by 26 inches. The Winchester people used to manufacture a magnificent match barrel of about the same contour as the barrel I experimented with and of a standard length, which they advocated as the best, of 26 inches. Perhaps they found this length about right; and I do remember Captain Richard stating that he believed it was the best all-around length. This test of mine would indicate something of the sort; but again another test might change things a bit; and there you are! Riflemen are rather prone to jump at conclusions—a natural enough attitude when one considers the vast number of enthusiastic experimenters. But this is very unsafe business at best, as the very next trial may completely reverse the first set of conclusions. However, we do know that the short, stiff barrel, other things being equal, is a very dependable proposition.

I believe the game of rifle-shooting is soon to benefit by one of the most interesting advances ever made in the art of barrel manufacture; a comparatively simple thing, too, and not particularly expensive. The greatest blight the rifleman has to contend with in these times is that of erosion. Ever since the introduction of the small-caliber, high-velocity weapon this matter has become increasingly serious. The modern bullet, which of course is of streamline form, calls for a construction that is not easily deformed in the bore, while modern powders, although somewhat cooler in comparison with those of earlier manufacture, are still fiery enough to create havoc with the most resistive of barrel steels over a very short period of firing. Added to this serious situation is the introduction of tin in many of our rifle powders, which, although admirably overcoming to a great extent the defect of metallic fouling from the bullet jacket as well as the great muzzle flash of our progressive-burning powders, does considerably increase barrel wear (erosion). Besides, the tin is most difficult to remove from the bore. Caustic soda will remove this tin-fouling, but the poor barrel suffers more from the cure than from the ailment.

Metallic tin at a very white heat is more corrosive than any acid. Such a condition momentarily exists within the bore of the modern small-caliber, or for that matter large-caliber, high-velocity rifle to an extent not generally realized. No wonder rapid fire plays havoc; and no wonder our machine-gun barrels are torn out, fired as they are at about 8 shots a second. However, a barrel can easily be treated so as to greatly reduce this wear under the most trying conditions, and in slow fire should last thousands and thousands of shots ere the slightest wear can be observed with instruments. This is encouraging news, I am sure, to American riflemen, and with a bit of patience they may yet benefit by it. Think what this means to the owner of a fine match rifle, sporting rifle or military piece. A fine shooting-barrel is a treasure; but as conditions now exist its life for highest results is comparatively short indeed.

For those riflemen particularly who will visit Camp Perry this year it may prove of interest to hear something about the accuracy of the ammunition and rifles to be issued them. It is thought that the rifles this year are the most accurate ever fabricated, although this statement is becoming rather trite when one considers that as much if not actually more depends upon the quality of the ammunition, other things being of the same high order of excellence. Be that as it may, the following tabulations are interesting for they disclose

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Bears Before Breakfast

By C. W. Price

ABOUT twenty-five years ago John Adams and his brother Billie (now Governor of Colorado) had a large bunch of cattle on their summer range at the head of the Chama River, just over the mountains in Archuleta County.

The grass was a little late on the hills, but in swampy places where shallow water was standing the broad leaf-grass was growing rapidly, and was eagerly eaten by the cattle. In places where the ground was soft slow progress was made, and the cattle's feet would stick fast for awhile in the mud.

An old grizzly found a dead carcass; then one mired down in a bog hole, unable to move more than its head. He found the diet much more satisfying than grass, roots, grubs in rotten logs and eggs in ant-hills; and soon learned, by having large flat feet, that it was an easy matter to overtake a cow out in a soft place, and that she was unable to make a quick turn to keep her short horns pointed at him, as she sometimes did on good ground. And all that he had to do after overtaking her was to slap a strong paw on her hip to pull her down into the mud, and a quick jerk with the other on her nose would break her neck. Then, by spreading out his toes and throwing part of his weight on his flattened legs, he could pull her out to hard ground; and—"Dinner's ready!"

A cowboy told me of the doings and I started preparations for a trip over there. I told my wife I was going fishing at the head of the Chama River and wanted her to get ready and take my niece and her husband (Mr and Mrs. H. J. Bostwick), and Mrs. Daniels and daughter, Nell, who were visiting us, along. Mr. and Mrs. Rob Kelly and their two children completed the party, with the exception of the two Mexicans who encouraged the pack burros to keep on the trail of our saddle horses.

We left my ranch quite early in the morning of the 29th of June and followed the Navajo River up to the Peterson place and then turned east to begin our climb over the Continental Divide to the West Fork of the Chama River.

There is a pass between Banded and Chama Peaks that makes it quite good traveling for a pack train, and the timber had been burned off 20 years previously, making plenty of room to zigzag as we ascended.

A fringe of dead white spruce, that had many bare limbs on them, lined the top and caused the wind to whistle and screech when it passed through them, suggesting the name of Phantom of Ghost Ridge.

We had no accident in crossing except that the cinch becoming loose on Miss Nell's saddle allowed it to slip forward onto the pony's shoulders, and the rider made a very unusual dismount by landing on her hands directly under the horse's nose.

We followed down West Fork till we came to a north branch where there was a fine growth of spruce and fir trees furnishing plenty of shelter; so no tents were needed.

It was too late to fish, but all planned around the campfire what they would do next day. Then some stories were told, and the trees were reminded that "My Bonnie Lies Over the Ocean."

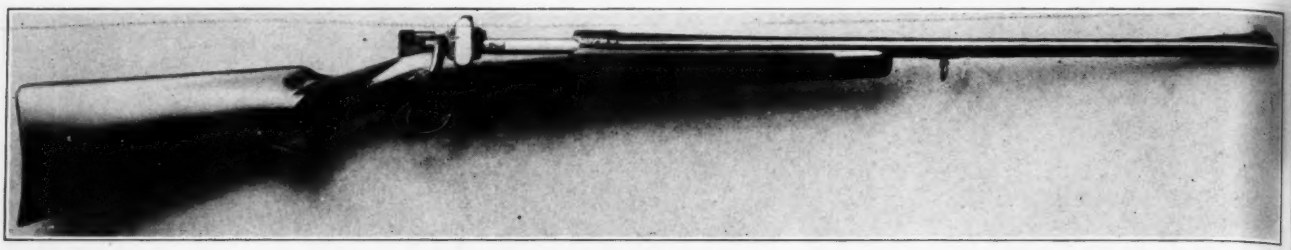
I did not mention my own plans. All the leaders of the horses and burros were hobbled except my horse, which was staked quite near camp.

About bed-time the burros came jumping and walking slowly into camp and remained quite near the camp fire. One of the women remarked, "I wonder why they don't eat, they must be hungry after that long trip."

Fearing she might not sleep well I did not suggest that it was probably due to the fact that they could smell bear. The sheep-herders find it necessary to hobble their burros to keep them from straying too far from camp, as the burros are quite often killed and eaten by bear. And that fact has been the cause of my receiving many a tip as to where to find a bear that was unusually bad, and which they wished to get rid of.

Although the others seemed to be sleeping well, I was awake early and waiting for a little light in the east. By the time near objects could be seen I was on my horse and at

(Continued on Page 29)



National Match Springfield Made Over Into Sporter

Our One Best Rifle and Its Proper Stocking

By R. G. ("Bob") Owen

IT WAS the writer's good fortune recently to be admitted to the sanctum sanctorum of finist rifle-making art—Springfield Armory. Under the guidance of our good friend Al Woodworth I was conducted from one department to another, and I must say that never in all my experience have I seen such thoroughness, such a system of inspection and such real testing as I found at the Armory. The thing that struck me most forcibly was the interest each workman took in the particular branch of work in which he was employed. From the room where the receivers are heat-treated to the place where the barrels are screwed into them, bolts properly head-spaced and trigger pulls adjusted, it was a pleasure to ask the men questions, for each seemed to know just why he did this or that, and each seemed to be imbued with one main idea—that of producing the world's finest rifle. And it is my honest belief that they are doing just that. If there is any institution in this world which can produce a perfect rifle, that institution is Springfield Armory. It is a concern with the United States Government back of it, in front of it and all around it; and your good Uncle Sam generally does things right, regardless of cost.

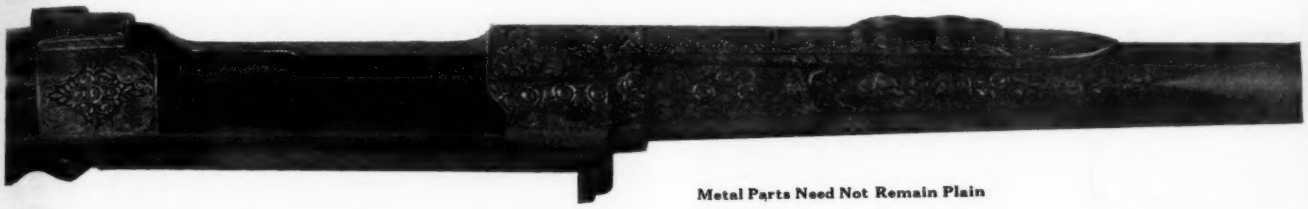
The Springfield rifle, when completely assembled, is essentially a military arm; but stripped of its rear-sight base and its military stock and bands it is material for the finest sporting weapon it is possible to produce; and this from any angle, including accuracy, dependability and general handiness, etc. Seven and a half pounds to 7¾ is about the right weight for a sporting weapon handling the .30-'06 cartridge; and the National Match rifle can be made up into a sporter weighing just 7½ pounds with 24-inch barrel, if the right kind of wood is used in the stock, the bolt-handle thinned down, the sides of trigger-guard properly narrowed, the straight-arm 48 sight used, with arm let into bridge of receiver, and the follower ground off so that the bolt will close no matter what the position of the cut-off, which latter operation also incidentally does away with the necessity of cutting away wood on the left side of stock. The cutting away of the bridge to receive the arm of the 48 sight not only removes some little weight, but incidentally provides protection for the sight arm, as well as making possible a lower front sight, which is highly desirable on a sporting rifle.

When Engraving Is Used It Should Include the Rear Sight

But a fine-shooting rifle, unless it be properly stocked, is only half efficient, is an eyesore and can never be the source of pleasure to the rifleman that a properly stocked rifle can. And this brings us to the matter of stocks; stocks not only for present conditions but also for what the future may develop in the way of telescope-sights. It is amusing at times to hear an old-timer say with pride, "Oh, I shoot with my head well up, in its natural position;" which, needless to say, is all wrong, the proper position being with the head well down and well forward, which means a higher comb and a thicker one, with perhaps an increase in the length of the stock. The shooter that wants a lot of drop and holds his head well up dates back to the time of the flint-lock and flash-pan, when, if one did not keep his head well back he usually got his eyebrows burnt. With the modern high-power rifle it is different; and to be comfortable the shooter must get down on his stock.

Today the shooter builds his Springfield Sporter wondering just which scope he will use; and the construction of the Springfield

Left Side of Above Rifle, Showing Cheek Piece

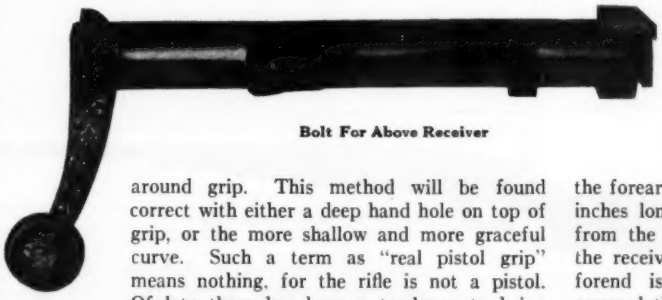


Metal Parts Need Not Remain Plain

Mauser, Winchester and Remington bolt-action rifles is such as to call for as high a comb as can possibly be put on. Sporting stocks have been so well written up by such men as Colonel Whelen, Captain Crossman and Capt. Paul A. Curtis that there remains little to be said in regard to dimensions. These well-known authorities are not only military riflemen, but big-game hunters as well, and they have studied the sporting rifle from every angle—utility, reliability and its adaptiveness to the beautiful. The average rifleman may well be guided and will profit by their suggestions. And in mentioning these worthy gentlemen it may be observed that while the writer has seen many criticisms of their efforts to help the tyro out, very few appreciations of these efforts are ever seen in print. I wonder how many of us would sit down and write, or rather typewrite, a four-page letter to some enquirer who wished to know which is the best of this or that.—But this is by the way.

How is the average man to find out just what size and shape of stock is going to fit him without spending a lot of money experimenting? About the best-designed standard stock obtainable in this country today is that found on the Government Springfield Sporter as sold to members of the N. R. A. The comb-lines on this stock will suit most shooters, the comb being high and almost parallel with the axis of the bore. Given a comb as high as possible, with an excessive slope to heel, and this combination will pound the face badly as the high part of comb moves backward in recoil. In regard to length from trigger to center of butt-plate, there is very little difference necessary for the man of 5-feet-9 to the 6-footer—probably a quarter of an inch at best, in a rifle. Contrary to the general belief, the length of the right arm does not determine the length of the stock, but rather the length of the left arm does, much depending upon where the shooter holds his weapon with his left hand. If he holds this hand well in toward the receiver he can shoot a longer stock than if the hand were carried well out on the forearm. Try this some time on one of your present rifles. Grip the weapon farther out with the left hand than you usually do, and then bring the butt up in the usual way as for snap-shooting, and the chances are that the butt of the stock will catch in your clothing on its way to your shoulder. In the same way hold the rifle, say, just forward of the receiver; and you will find that the gun appears to be short in the stock. So, unconsciously, the left arm determines the stock length.

Pistol grips are as a rule measured wrongly. Usually a cord is drawn from the end of the trigger to the end of pistol-grip cap. This may or may not give a correct measurement, depending upon how far down the stocker carries the end of grip. The proper way to secure a comfortable pistol grip is to measure from a point between thumb and forefinger to the middle pad of finger, allowing about a quarter of an inch for curvature of finger around grip. This method will be found correct with either a deep hand hole on top of grip, or the more shallow and more graceful curve. Such a term as "real pistol grip" means nothing, for the rifle is not a pistol. Of late there has been a tendency to bring the grip too near to the trigger, which is just as bad as, or worse than, having it too far away. Personally I should prefer the latter evil of the two.



Bolt For Above Receiver

Large forearms have also been advocated, and these have been overdone. The good full forearm is to be desired; but it is not without its dangers, and will bear thinking over. Wood, no matter how old or how well seasoned in the blank, will warp and shrink after the blank has been worked into a finished stock. It will be easily seen that should a heavy type beaver-tail forearm, with much wood in it, take a notion to warp with the changes of climate, it would be inclined to change the point of impact of the rifle from time to time, owing to its great strength as compared with the medium-sized forearm, this strength producing great strain in the barrel, either sidewise or up-and-down, as the case may be.

A good stocker will select his stock blanks so that the grain runs as straight and as parallel to the side of the stock as possible. This is one of the reasons that we see so many stocks that have very pretty butts, but are apparently plain from the grip forward. In best practice forearms are horn-tipped, the horn usually being called "English Horn," though in reality most of it comes from Belgium. The length of forearm being a matter of taste, much depends upon where the sling-swivel is to be placed. If the swivel is to be attached to the barrel, a forearm 9½ inches long over the end of horn will be found to be about right, the horn affording a good grip and helping to pull the rifle tight to the shoulder. Swivels should never be brazed to the barrels, nor should sight-bases. Brazing requires too much heat, and will ruin a barrel nine times out of ten. Rather a solder consisting of 60 per cent tin and 40 per cent lead should be used. Should the sling-swivel be required to go through the forearm, the latter should be at least 10½ inches long, these measurements being taken from the point where the barrel screws into the receiver to end of the horn tip. If the forend is too short with the sling-swivel screwed through it, the latter will be a constant source of bruised forefinger on the left hand, caused by the forefinger coming into contact with the swivel as the rifle recoils. The swivel sweated to the barrel is to be preferred on a sporting rifle, for when fastened in this manner the swivel can be placed farther out on the barrel than is possible when screwed through the forearm; and incidentally with the swivel so placed, when carrying the rifle with sling over shoulder the muzzle of rifle is carried lower.

Personally I think that the easiest way to obtain a stock that fits is to purchase one of the Government sporter stocks through the N. R. A. Thin down the grip a little at a time until it suits the hand, and then try the length. Usually the stocks are amply long; and the comb is just right as it is. There should be no difficulty in thus getting a properly fitting

(Continued on Page 32)

Floor Plate and Guard Lend Themselves Well To Ornamentation

The Manufacture and Testing of High-powered Rifles

By W. D. Higgins

EDITOR'S NOTE.—For some time we have felt that a series of articles on the manufacture and testing of firearms and their ammunition would be of very real interest to a large number of our readers. Accordingly we approached the different arms and ammunition companies with the inquiry as to whether they could see their way clear to cooperate with us to the extent of each company providing one article of the series, upon a subject to be later designated by us. The responses we received to this inquiry were so encouraging that we at once submitted to these companies a schedule listing the different subjects to be covered and the company which we should be glad to have handle each subject.

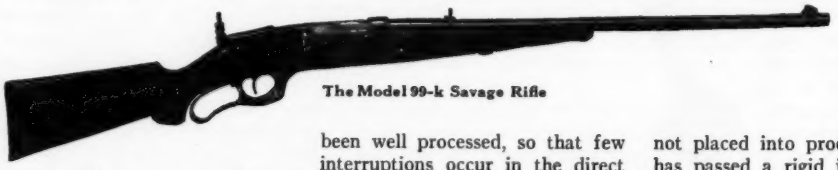
The first article of this series to be received by us was this one on the manufacturing and testing of high-power rifles, which, with the illustrations accompanying it, has been contributed by the Savage Arms Corporation, and covers the manufacture of the Model 99 Savage Rifle, which for years has been popular with sportsmen in all parts of the world.

WHAT worlds of romance are wrapped up in the sturdy stocks and glistening barrels of innumerable high-power rifles hung up on the walls of dens; packed securely away in compact leather cases; relegated until the open season to gun racks and cabinets.

Most every one of us has a thrill out of just "getting the feel" of a good rifle—and most every good rifle has reams of thrilling tales to unfold of those golden hours out in the open spaces or heavy timber. The high peaks of those tales are the fine shots that were pulled off—the game that was eventually brought down—for the "bag" is the true record of man's success out in the open with a rifle.

The "bag," however, depends in large measure on the arm. Much of it, naturally, rests with the hunter—his eye, aim, speed, poise and experience. Those human assets are only developed by usage—those traits of the rifle depend on the design, the craftsmanship, the ability of the workmen, the quality of materials and the determination of the manufacturer to make sure that nothing is lacking in making each one of his arms as nearly perfect as possible.

Now, when it came to detailing the operations and processes involved in the manufacture of high-power rifles and in the testing thereof, I felt that perhaps my experience had brought me a bit too close to the subject to avoid sinking into the purely technical. Association daily with the many manufacturing processes involved, might easily lead me to overlook many of those points which would naturally be of interest to the average layman.



The Model 99-k Savage Rifle

Therefore, I asked one of my friends—a former infantry sergeant whose experience in the A. E. F., and whose contact with high-power rifles in the woods gave him the proper understanding of what was taking place—to accompany me through the plant of the Savage Arms Corporation, observing the manufacturing of Hi-power rifles, and relating to me the phases which caught his attention. Naturally we started at the beginning; that is, we began with the introduction of the raw materials into the plant and followed each step through. To enable us to work out a story of sequence we determined to follow the various operations on one type of Savage Hi-power rifles, and we selected the Model 99 Lever Action rifle because the company was originally organized to manufacture this famous design of hammerless type rifle, and although many new models have been introduced this arm continues to be the outstanding Savage Hi-power rifle in popularity with sportsmen throughout the world.

The Savage manufacturing operations have been well processed, so that few interruptions occur in the direct routing of material, the primary work being on the lower floors of the plant in the store-rooms for the steel bars for barrels, the heavy drop forgings for receivers, the blocks of selected walnut for stocks and forearms, etc. Each principal component goes to its separate manufacturing building—the receivers to the machine floors, the barrels to the barrel-room and the walnut blanks to the woodworking shop to be manufactured to exact specifications. During the time the major components are going through their individual manufacturing buildings, on other machine floors the many smaller components, such as triggers, sears, bolts, finger levers, special screws, etc., are started so that all parts are brought together again in a finished-part storeroom. They are issued from there in orderly sequence to the assembling floors to be made into finished rifles.

VITAL NEED FOR SPECIAL TOOLS

One of the most interesting phases of arms manufacture is the almost unlimited need for special tools, each operation of any sort requiring its own set of tools. Therefore, arms plants naturally have their own complete tool-shops wherein these small grinders, cutters, polishers, and implements of all sorts are made and kept in repair. The manufacture of the tools in the Savage plant requires a large corps of highly specialized workmen, because the turning out of any one of these tools is as delicate an operation as the boring or rifling of a barrel. The tool-manufacturing department was passed through to the more romantic operations of actual gun-building.

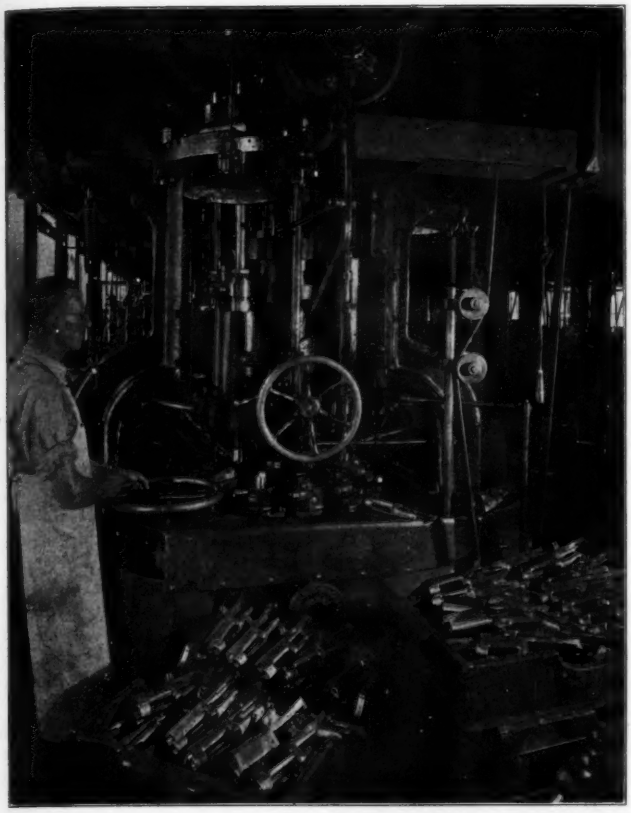
PURCHASING AND TESTING OF MATERIALS

On our way to the supply-rooms, another highly organized department for the purchasing and testing of materials was passed through. The purchasing of proper material and well-timed delivery is one of the most important departments of a manufacturing plant and is particularly so in the selection and purchasing of material for Hi-power rifles.

The barrel steel comes to Savage in solid round bars 1 1/16 inches in diameter. This steel is the same high-grade smokeless gun-barrel steel selected after exhausted tests by military experts as the best material available for the manufacture of our .30 Springfield Army Rifle by the United States Government. The physical specification for this steel is an elastic limit of 75,000 pounds per square inch. Each lot of forgings, steel, and any other material which enters into the manufacture of the rifle is tested by chemists and metallurgists, and is not placed into production until all material has passed a rigid inspection.

FOLLOWING THE RECEIVER

From the supply-rooms with their rumbling trucks of material moving to different parts of the plant we followed a lot of receiver forgings that were on their way to the machining-floor. The first and most vital operation in manufacturing begins by grinding the left side and top of receiver to accurate flat surfaces which act as locating points for all the operations that will reduce the solid forging that weighs seven pounds down to one and three-quarter pounds. It took us an hour to pass through the machining-floor, stopping frequently to inspect the operations on the receiver. But the rough forgings we followed from the store-room would not arrive at the finished-parts department until three months later. As a matter of fact, the sergeant made rather a game of trying to keep track of the number of operations involved in the manufacture of a Model 99 Hi-power rifle, and only missed it by about 200. It was at once apparent in the machining operations the enormous preparation required in tools and machinery to manufacture a rifle. We examined with much interest one machine that was built to perform at one time eight separate drilling operations. Row after row of profile machines were inspected that all looked much alike. On close inspection, how-



A Special Machine For Drilling Model 99 Savage Receivers

A Profiling Machine. Holding the Guide Pin in the Profile Form to the Right Is Not as Easy as It Looks

ever, each machine had a different fixture that was built with infinite care in the toolroom to perform one cutting operation.

The receiver in every fixture operation is firmly held by two or four locating holders or guides which do not allow any deviation in the cutting operation here performed. The punching of these guide holes and locating points must of necessity be exact; otherwise every following operation would go wrong. The holes drilled in the receiver that are used as locating guides in the fixtures eventually are the screw holes for the assembling of the action, but in the early stages of production they are utilized as guides. In setting the tools for these fixtures there is less than one-thousandth of an inch leeway permitted because the slightest deviation would mean a wasted receiver and all the workmanship and effort that had been put on that one receiver would be lost.

On many of these fixtures, two separate operations are accomplished simultaneously. All the operator has to do is to control the levers so that equal pressure is distributed on the receiver throughout the cutting process. This sounds simple enough, and the sergeant who accompanied me could not understand why it was difficult to train men for this work until he took hold of one of the machines and spent two or three minutes in doing what the average workman does in thirty seconds.

As we passed through machining-floors, stops were made to examine the intricate gauges that are applied to the receiver after every operation to make sure no one operation has gone wrong that would later cause the entire finished receiver to be rejected. Stops were made to watch many of the smaller operations on the receiver and component parts that are done by girls on ingeniously designed small machines.

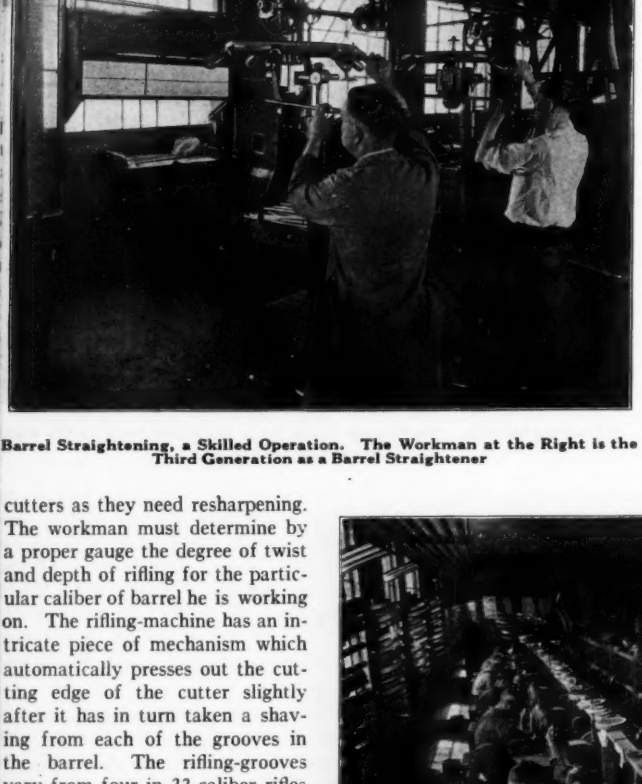
THE BARREL-ROOM

In the stockroom we had seen the long heavy bars of steel sawed to the proper length to make 20-, 22- or 24-inch barrels. At the entrance of the barrel room we saw these rough bars being straightened and made ready for the boring-machines. The solid bar is placed in a revolving boring-machine on which the drill is stationary and the barrel is spun at a high rate of speed against the drill. These drills are hollow, very hard steel, and are kept cool by a constant flow of oil being fed through the drill into the work. It was noticeable that throughout the barrel-manufacturing rooms the machines were all fed with a very high-grade oil much in appearance like that used in our automobiles. In all the machining-rooms we had previously passed through most of the machines were lubricated with a white liquid solution that is made from a high grade of soluble oil, mixed with a percentage of water so that it is the exact texture for each cutting and grinding operation.

In watching the barrel-drilling operation, my companion questioned why the barrels were spun around while the drill was stationary. It was explained that by this process the drill centers itself in the barrel and a straight hole through the exact center is secured. Rows of machines were passed on which the surplus stock was being taken from the rough barrel multiple cutting machines were cutting the surface of the exterior of the barrel to octagon shapes, and the barrel was finished to its exact exterior dimensions. From here, the now semifinished barrels were put on rifling-machines. The workmanship entailed in this type of work must not only be skillful but exceedingly careful

On the rifling-machines, which hold five rifle-barrels at a time the cutters work on screw and do the cutting operation on the back draw of the cutter; that is, the barrel is held stationary, the cutter is fed through without operating, and as it is drawn through the barrel it is turned to make the proper twist and shaves a fine steel shaving from the barrel as it is drawn out. A skilled operator is required to determine just how fine the cutting has become and to frequently change the

Barrel-rifling Machines. Precise Manufacture Is Necessary to Secure Accurate Shooting Barrels



Barrel Straightening, a Skilled Operation. The Workman at the Right is the Third Generation as a Barrel Straightener

cutters as they need resharpening. The workman must determine by a proper gauge the degree of twist and depth of rifling for the particular caliber of barrel he is working on. The rifling-machine has an intricate piece of mechanism which automatically presses out the cutting edge of the cutter slightly after it has in turn taken a shaving from each of the grooves in the barrel. The rifling-grooves vary from four in 22-caliber rifles to six in Hi-power rifles. The average time for rifling one barrel, or rather for rifling five barrels at a time, is approximately 40 minutes. After rifling, the barrels are then straightened and chambers are cut for the particular caliber cartridge for which they are intended to be used.

A Corner of the Polishing Room. All Metal Parts are Finished to Glasslike Smoothness

Lunch time had now arrived and in discussing our morning's tour of the plant, I asked the sergeant what his first impressions were, and he first said, laughingly, "A profusion of oil." Then he admitted that he was amazed at the endless care and supervision given to the working out of each small part and each operation, and the scientific methods employed to make this manufacturing more sure and more efficient.

STOCKS AND FOREARMS

Taking up our tour in the afternoon, we followed the interesting course of the manufacture of stocks and forearms. The aromatic odor of walnut wood, the hum of saws, and the absence of splashing oil made the sergeant remark that here was another industry in itself. Here in orderly process, blanks were sawed from specially kiln-dried walnut and sent into forming-machines where rough outlined stocks emerged to be cut out by special machines to the proper cuts to take barrels, end of receiver, butt-plates etc.

The rough stock proceeded to the finishing end of the room, where the rifle-receivers that we had seen in process earlier in the day had now reached us clean and polished and had acquired a number. Workmen hand-fitted the rough stock to a receiver and finished it down to exact proportions by hand. The number of the receiver is stamped on the stock under the butt-plate, and each proceeded on its separate way again—the receiver to be blued and polished, the stock to be varnished and finished.

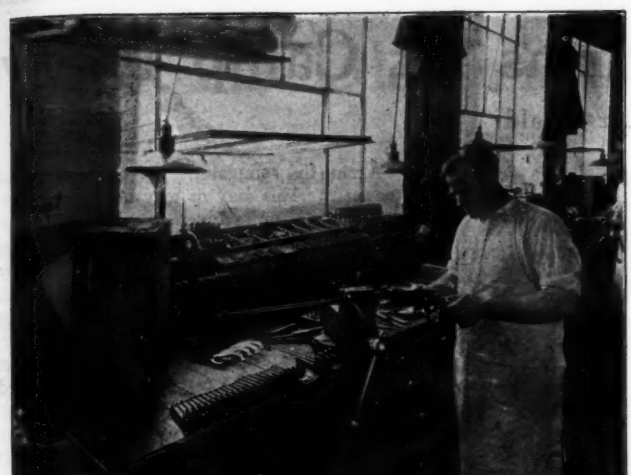
We followed the finished stock after its final forming to the varnishing-room. Here stocks received three applications of varnish which is rubbed down with pumice-stone and oiled between each application. The stock remains three days in the varnishing-room and passes on to the finished-store department with a heavy coating of rubbed-down varnish that makes it weather-resisting under all ordinary hunting conditions. The sergeant, from his Army training, voiced his opinion that a walnut stock should be finished by an application of linseed oil rubbed in, and asked why the large commercial firearms manufacturers did not finish the stocks of their arms in that manner. It was explained to him that a proper oil finish would require the daily attention of the workmen for at least three weeks and would make the cost very high. Further, in the method of distributing firearms, one of our products might be in the jobber's and dealer's stock a year before it reaches its ultimate customer. During this time the oil finish would have dried out considerably and the arm present a very unattractive appearance. The rubbed-oil finish is much like polishing one's shoes—it must be done frequently to keep its good appearance.

Leaving the wood-working operations at this point the various finishing departments were visited. Naturally from the machining and cutting of steel, there are bound to be many rough edges and corners that must be smoothed off so that any possibility of untrue operation will be eliminated in the part. In the filing-room skilled operators were working on the many metal parts that had passed through the machining-room and preparing them for final polishing.

The polishing-room is a hum of high-speed activity. Special carborundum wheels must be built by the skilled foreman of this department for many different polishing operations. Every part is here finished to a glass-like smoothness and then passed to the metal-finishing departments. The small component parts pass through carbon furnaces, where a permanent blued finish is given them. At this point the receivers are heat-treated and hardened at all stressed points to withstand the high pressure of smokeless-powder cartridges to be fired in them.

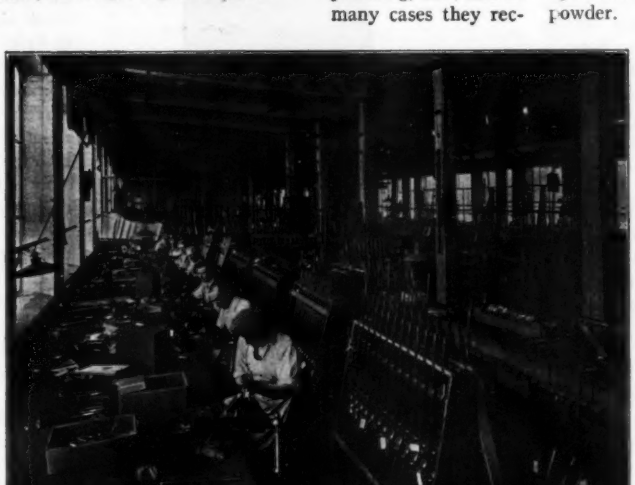
We followed a lot of receivers that had been hardened and were placed on a truck to go to the barrel- and receiver-finishing rooms. Here the receiver was thoroughly

Hand Finishing Stocks. Each Stock is Fitted to the Receiver to Which It is Later Assembled



Assembling the Action of the Model 99 Savage Rifle—a Highly Skilled Operation. Note Sand Box in Front of Muzzle. Dummy Cartridges Might Be Loaded

washed to take off all impurities and clean out all dirt. It was then painted with a rust-producing acid specially prepared by the company, and was placed in a steam-room, where it was thoroughly steamed for 24 hours. It emerged from here with all exterior surfaces covered with a bright red rust and was placed on a polishing-wheel, which breaks down the rust forming texture and smooths out the material. Then it is painted again in the same acid and put back for another steam bath. This operation is repeated for three days, and the receivers and barrels eventually emerge with a heavy black glossy rich coat secured by polishing the rusted surface down and treating it with oil.



Inspection Room. Every Savage Rifle is Rigidly Examined Before and After It is Fired For Proof-testing and Accuracy

ASSEMBLING THE RIFLE

Although our day was almost spent, our time had been devoted entirely to the inspection of the manufacture of parts and we had not yet seen a finished rifle. Our arrival at the finished-parts-assembly floor therefore brought us to a dividing line in the manufacturing process. Here every manufactured part of the rifle has been assembled and from here the actual manufacturing of the complete firearm begins. The carefully worked out production schedule has given the plant management information as to how many of a certain caliber of rifle will be required in the shipping-room at a fixed date. The foreman of the assembling-room explained to us he had instructions to assemble 100 Model 99 rifles, style G 300-caliber. He therefore requisitions from the finished-parts stores 100 receivers, 100 barrels, and 100 of each principal component to be distributed to a fixed number of assemblers. It is at this point that the most skillful operators in the manufacture of a Hi-power rifle are required. While all component parts are made to gauge, there is yet enough deviation caused by the wearing away of tools and other minor conditions to make careful filing necessary to accurate fit. It is also necesary to leave some parts slightly oversize for fitting and only the most skilled workmen can fit these parts to the proper adjustment. All of these men are old hands; most of whom have been with the company fifteen or twenty years. They are capable of discovering any error in machining, drilling, boring, polishing, etc., and in many cases they rectify these mistakes themselves; in other cases they send parts back to their respective departments for correction. The assembler knows exactly what every small part of the Hi-power rifle is designed for; what its strength must be. He must have a scientific eye; must have been on a number of the different tooling operations himself. For instance, in the fitting of the bolt in the 99 receiver he must be skilled in filing certain bearing points to exact adjustment; he must be skilled in determining the maximum and minimum head space between the face of the bolt and the barrel because after his fitting operation is finished the bolt is then hardened and can not be further changed. There are 32 major component parts that must be fitted to coordinate smoothly and quietly with each other, and it is most difficult to learn to do this skilled and intricate assembling. When the barrel and receiver have been fitted, the action assembled, and the properly numbered stock fitted to the receiver, the finished arm then goes for its first inspection.

INSPECTION

The inspection-room is in charge of graduate assemblers and trained mechanical engineers. Each arm passes to several different inspectors, each having a particular part of the rifle to inspect. If the arm passes its first rigid inspection it is then sent to the gallery for firing. Like all visitors at an arms plant, the sergeant's weary footsteps quickened at the report of Hi-powered rifles and his head came up like a hunting dog with the odor of burned powder. We watched the first interesting process of testing the rifles in steel boxes for safety and then watched the marvelous skill of expert shots in aligning sights and inspecting fired cartridge-cases for any defect in the fit of the cartridge to the chamber that is made apparent to them by the slightest bulge in the case or traces of powder marks. Critical inspection here sends back a rifle that has the slightest defect in firing to the assembler, who must correct the defect and bring that particular arm back for supervised firing before it is passed as a perfect arm.

PACKING

Loaded on trucks, the finished arms are taken on an elevator (on which we were grateful to ride) and sent to the packing- and shipping-rooms. In the packing-room each gun is carefully covered with a coating of special non-running grease; the barrels are carefully coated so that every exposed surface is

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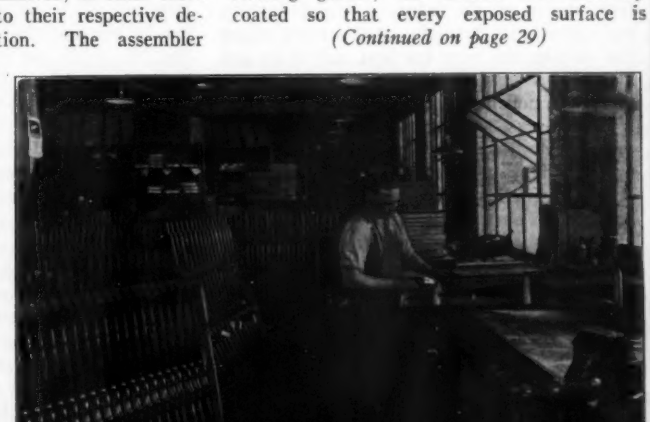


Packing Rifles In Individual Boxes For Jobbers' Stocks

Tuning-up the Side Arms At Camp Perry

By J. H. Fitz Gerald

IT HAS been my pleasure for many years as demonstrator for the Colt's Patent Fire-arms Manufacturing Co., Hartford, Conn., to associate with the shooters throughout the United States, including police departments, bank guards, state constabularies and target-shooters—to meet on their ranges and in their clubs, to hear the stories of their successes and their troubles, and to try and put them on the straight and narrow path to perfect scores.

The work with the police constitutes a course in quick, accurate shooting, which will be explained in a later issue.

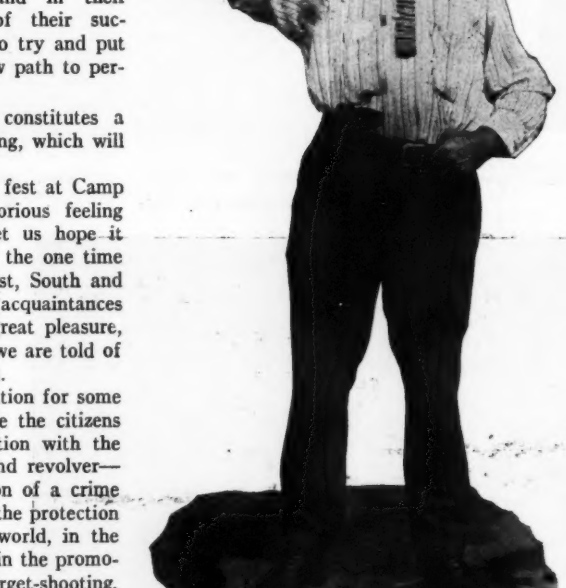
Again, we have the big shoot fest at Camp Perry, and that grand and glorious feeling which we missed in 1926. Let us hope it will not be missed again. It is the one time in all the year when North, East, South and West get together and renew old acquaintances and make many new ones—a great pleasure, with just a touch of sadness as we are told of some friend who has passed on.

I believe it would be an education for some of our crime commissions to see the citizens from the different States in action with the much-abused automatic pistol and revolver—not being used in the commission of a crime but ready to use if necessary in the protection of the greatest country in the world, in the safeguarding of their homes and in the promotion of the king of all sports, target-shooting.

I have followed the shooting game ever since I was able to hold a revolver (never mind the date), and the sight which I long for each year is the solid mile of clear-eyed he-men punching holes in the bull's-eye at Camp Perry.

The revolvers and automatic pistols have always been my favorites for several reasons. First, a small case easily carried will hold four or five of the favorites, cleaning outfit and cartridges. Secondly, it is a game where the shooter can wear his best suit if he can make his hands behave. And another source of satisfaction lies in the fact that the target is never over 50 yards away, so that you can easily see with a small pair of field glasses exactly where your bullets are going.

My instructions from the Colt's company are to help out the shooters and make them happy. And I believe I derive more pleasure from sitting behind my little table under my tent (and big hat) and hearing the sad stories of the different shooters, and trying to send them back to the firing-line with a smile, than I do in shooting in the matches myself. And while the troubles may seem great to the shooters themselves they are really very slight. For instance, one shooter will tell me that his sights are too narrow—that he can not see them. In nine cases out of ten this may be corrected by opening up the rear notch (still retaining the U shape, which is the only shape that has been permitted in the National Matches to date). I believe the narrow sights as now furnished are better for rapid-fire shooting than wide sights provided that they can be seen. If, however, after the opening process they can not be seen clearly, then the only remedy is the ⅛-, 1/10-, or ½-inch front sight, with rear to match. These and many other changes in the arms which I will mention are not in any way a reflection upon the workmanship and material in the arms used, but rather are based upon the individual requirements of the different shooters.



The Correct Firing Position

The bystander may look in my direction and see me work over two .45 Automatics. One owner may wish to have the wide sights changed to the narrow, while the other wishes the narrow sights changed to the wide. Many changes such as these are the result of the shooter having stood on the firing-line next to some shark with the other kind of sights who is making a collection of tens and nines only. We shooters are always trying to gain a point or two by some change in our arms. Some changes help a little, but the greatest changes in the scores (for the better) are made by practice.

Again, the complaint, "My pistol shoots to the left." This may or may not be the fault of the pistol or revolver. Sometimes enough pressure is not exerted with the thumb, and when the trigger is pulled (or properly squeezed of) the arm will swing to the left. Exert the same pressure on each side of the pistol and pull straight back on the trigger, slowly and carefully. If this will not correct the trouble then the rear sight may be moved to the right. Many times I have made this correction for a shooter, and after a few days on the firing-line he has come back to have his sights back to the original position.

Another complaint is that in the forenoon the arm will group the shots on one side of the bull's-eye and in the afternoon on the other side. This is caused by the difference in light, and it is better to hold over a little for correction than to move the sights on a properly sighted arm. Right or left groups may be caused by canting the pistol to the right or left, as the case may be, and again high or low shots may be caused by seeing too much or too little of the front sight in the rear notch. The front sight should just fill the rear notch as to height, with an even distribution of light on each side of the sight. If this does not correct the trouble a higher rear sight will raise the group; or this may also be accomplished by filing the top of the front sight. If the group is high a higher front sight or a lower rear sight will bring it down.

And now for the jinx, flinching. No matter how well your pistol is sighted, if you flinch as you squeeze the trigger sight corrections are of no avail. Plenty of dry shooting is what you need; and take pains with every shot. Learn to call your shots. Study light conditions.

Next, the trigger pull. Government requirements call for a 6- to 7½-pound pull. Camp Perry has in the past allowed a 4-pound pull; and this of course means that all the trigger pulls must be changed. A 4½-pound trigger pull is about right on this arm. The changing of the trigger pull is a very simple operation if the sear and hammer have not been previously tampered with. I have arms brought to me for adjustment that have been adjusted to heat, cold and three positions by someone who was not familiar with this work, and it usually means a new sear and hammer. I have been asked many times to show the proper method of changing a trigger pull. That is something I can not determine until I have seen the parts. The degree of use that the arm has been submitted to determines the amount of adjustment necessary. Many times I adjust a trigger pull; and next day, or later that same day, I receive the same arm for correction with the same story that the pull did not stand up; that the hammer follows the slide. And this

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Meet An Old Friend Brought Up to Date

By J. R. Mattern

THIRTY odd years ago the War Department fathers designed a rifle-cartridge that possesses certain features of efficiency hardly excelled in any others today. This superior cartridge has been in eclipse somewhat, because of popular interest in newer things and for other reasons. Thousands of the rifles handling this cartridge are in the hands of shooters all over the country, who do not at all realize the full capabilities of their guns, much less the advantages.

As to the accuracy of this cartridge, there is the story of a certain shooter in a prominent shooting locality who had been using a .30-'06 International Match rifle of extreme accuracy. At the various local meets this man kept winning prizes so persistently that he, or rather his fine target-rifle, was barred from further competition. He sold that target-rifle and for a while kept away from the shoots. Then presently he bought himself two other guns—one another target-rifle similar to the one sold; the other nothing more or less than one of these old relics we are talking about.

He appeared on the range with the target-rifle, and after winning a couple of "pools" with it, was promptly barred from its use, the same as he had been before—exactly as he expected to be. "But," the guileful old fellow proposed, "will you let me use this old gun, this 30-year-old blunderbuss, that is next thing to a bow and arrow?" They looked at his gun and they looked at him, and grinned. Such a rifle could not compete with target-guns. Certainly he could use it; and he then and there was given the right to contribute entrance fees in all matches throughout the season. Which decision was also exactly as he had planned. Our friend went to work with the old cartridge, trying this load and that one, until he had the rifle shooting about as close at 100 and 200 yards as the finest of Springfields. Then he began attending the shoots, and it is on record that he walked away with rather more than half of the prizes for which he competed.

As to the power of the old cartridge, a certain hunter who goes to Canada regularly after all the seven or eight species of big game obtainable there, and takes his wife along, was casting about for ways and means of getting more killing power in less pounds of gun. He had been taking along the baby cannon ordinarily looked upon as desirable by many hunters, but both the man and the woman are rather small. A heavy gun becomes exceedingly wearisome to such folk. A very heavy cartridge soon kicks out of them all semblance of ability to shoot accurately.

The justly famous .30-'06 cartridge was discarded because it had to be backed by two much wood and steel, and 7 mm. chosen instead. For the latter a rifle could be a full pound lighter while bearing the same relation to its cartridge. As this hunter and some of his friends were looking over the ballistic tables they chanced on a line of figures better in velocity, power and trajectory than the figures of 7 mm., and were astonished to observe that they belonged to the old cartridge under discussion. The best the factories do for 7 mm. is to give its 175-grain bullet 2,300 f. s. velocity, with energy of 2,056 pounds. The old cartridge drives its 180-grain bullet at 2,500 f. s. velocity, with energy of 2,490 foot-pounds. If there is any difference in the size of the two cartridges, the 7 mm. is a trifle the larger in powder space. They employ almost identical powder charges, but the old cartridge-case is peculiarly efficient in shape for the burning of smokeless powder.

What it can do by reason of this efficiency was further brought out by some comparisons with .30-'06 loadings. Although the old case is lighter and smaller, and employs less powder to do it, bullets of 150 grains are driven by it at 2,700 f. s., the old standard velocity of .30-'06. To do this, the breech pressure is only about 42,000 pounds, as compared with standard of around 49,000 pounds in 30-'06. Different powders are used for these results, of course. Maximum velocity of 150-grain bullets in the old cartridge is only 2,825 f. s. as compared with 3,000; but 2,825 feet is high speed.

The old cartridge can send 180-grain bullets not only at 2,500 f. s., which is the velocity of factory loads of this type, but actually at 2,600 f. s., without getting pressures above 43,000 pounds. The 30-'06 gets 2,700 f. s., and a bit more sometimes with the 180-grain bullet, but develops 50,000 pounds and above to do it.

In the 30-'06 the only 190-grain load listed by a factory develops but 2,200 f. s. velocity. Our good old cartridge is not loaded by factories with this bullet, but can be hand-loaded to give 2,400 f. s. velocity, pushed by a pressure of only about 42,000 pounds. As for 220-grain bullets, 2,200 f. s. velocity is the old 30-'06 standard. The other cartridge drives this bullet at 2,225 f. s. velocity, using three grains less powder and a thousand pounds less pressure in hand-loads, or at 2,200 f. s. in factory load.

The secret is now about out; and we may as well name this old ring-tailed wonder of efficiency. It is none other than the .30-40 Krag.

Although .30-40 rifles are not supposed to be very accurate with 150-grain bullets, on account of the long throats, or leads, of their chambers, some .30-40's will handle these bullets; and it was with this bullet that the target-shooter mentioned cleaned up his prizes. At least one company—Peters—furnishes a factory cartridge with this bullet in soft-point, game-killing type. Remington, Western and Peters furnish .30-40 cartridges loaded with 180-grain expanding bullets at 2,500 f. s. velocity, and Remington, if not others, furnishes cartridges with 220-grain bullets at 2,200 f. s. velocity.

Time and again I have been impressed by the value of the .30-40 as a knock-about gun with light recoil, flat trajectory and high killing power. Many of its virtues have certainly been overlooked. When the Krag was prominently before the public, in the early days of the cartridge, no such good loads were available, and the cartridge is today known largely on the basis of its early inferior loads. It was the coming of better powders, such as Nos. 16, 17½ and HiVel, that modernized the .30-40; but only in the last few years have 180-grain bullet cartridges of expanding type been available from the factories. The public lacks information about all such advanced loadings, not only as to which factories furnish them but even as to their actual existence. If more shooters knew the possibilities of the .30-40 many a Krag and Winchester now relegated to the cobwebs would have the grease taken out of it, and store shelves would be stripped of .30-40 ammunition.

The rimmed head of this cartridge is a decided limiting factor in its more general use. The rim prevents its satisfactory use in ordinary bolt-action Springfield, Mauser, Winchester and Remington rifles. The top cartridge in the magazine catches on the one beneath it; and also the rimmed head is thicker than bolt head space provided for rimless cartridges for which these rifles are designed. That leaves only Krag-Jorgensen and Model 1895 Winchester rifles regularly chambered for 30-40, in addition to single-shot Winchester and Stevens guns. But I have seen Ross 303 military rifles rebarreled for .30-40, and they make wonderfully light and handy hunting-arms which owners never willingly part with. The Ross magazine, built for a rimmed cartridge and handling the .30-40 perfectly, shows what could be done in Springfields, Remingtons, etc., to make them also handle it. The end walls of the magazine must be slanted backward, as the rifle in firing position is viewed from above, so that each successive cartridge put into the magazine lies the thickness of the rim forward of the one below it. As 30-'06 magazines are too long anyway, pieces of aluminum can readily be shaped and inserted in them to give this necessary inside form. Mannlicher rifles, particularly as made for 6.5 mm. cartridge, are readily adapted for .30-40. Perhaps the most unusual .30-40 adaptation was a Model 1886 Winchester I saw that had been fitted with a barrel for this cartridge. It looked like a .33 Winchester, but had been developed from a .45-70.

Any of these various rifles can be cut down to weigh no more than 6½ or 7 pounds, with no greater recoil relation to the .30-40 than a 7¾- or 8-pound rifle bears to the .30-'06 cartridge. Or the 30-40 can be made to weigh 7½ pounds on about the same basis that a Springfield weighs 8½ or 9 pounds. Such a rifle has a wider choice of bullets than the

Savage .300, and particularly can it use heavy bullets to advantage. While the gun is just as light as the 7 mm., the cartridge is more powerful.

In rebarreling .30-40 rifles these should be specially chambered for the 150-grain bullet instead of the 220-grain one, thus insuring fine accuracy with all loads. Ordinary Krags and Winchesters may or may not be finely accurate, and will not be desirable if they are not. A bit of picking and choosing may be required among a few guns to get an accurate one, particularly for the 180- and 150-grain bullets. Special loading to meet the needs of any particular barrel, however, will go a long way toward developing fine accuracy of performance from it. This statement is perhaps more true of the .30-40 than of any other cartridge.

How to load the Krag for utmost accuracy is something not well understood now. First, we have the fact that with *proper* 220-grain bullets at about 2,100 f. s. velocity, long-range target records were made in good weather before the days of the .30-'06 that have been little bettered to this day. Such proper bullets with full front section that fills the long throat, are rarely obtainable at present. Those of this weight that we do get are made small in front section to chamber freely in rifles throated short to fit 150-grain bullets. Besides this fact, the blunt-nosed, low-velocity bullets are drifted by the little breezes so much that our errors of guessing materially discount their intrinsic accuracy.

Now that the fundamentals have been stated, I am ready to tell why such old stuff needs to be repeated here. We are going to "nail" certain wrong ideas about that famous long throat of .30-40 rifle chambers, and about the relation between modern pointed bullets and the old-fashioned 220-grain bullets. Let it be understood that the following applies to good 30-40 barrels; to the ones that measure .308-inch in grooves, and not .310 or .311 inch, as occasionally a barrel is found to measure.

For the purposes of this article a very good old star-gauged Krag rifle was selected to investigate and to shoot. Into this standard rifle we chambered a normal factory cartridge with 220-grain bullet. Then we removed that cartridge, after measuring the exact distance from its bullet tip to gun-muzzle, and pushed up into the rifle throat one of the good old 220-grain bullets. That bullet advanced 3/16ths of an inch before it was stopped by the rifling. From its position as held in a cartridge it would have to jump 3/16ths of an inch to get a bearing in the barrel. This old bullet measured a full .308 inch in diameter.

In succession, following this 220-grain bullet, we pushed into the rifle throat modern pointed bullets of 150-grain, 180-grain and 200-grain weight, pushed in a 174-grain spitzer of Mark VII 303 British and a 190-grain 303 Savage, all jacketed.

To our surprise every one of these bullets advanced actually *less far forward* in the barrel before being caught and stopped by the rifling than the old 220-grain bullet. Strange as it may sound, these other bullets would need to jump a less distance. There was less than an eighth-inch difference in the position of the various bullet points when farthest forward, including all weights from 150 to 220 grains. The groove-bearing diameters of 150- and 180-grain spitzers, therefore, are not farther back on them than is the groove-bearing diameter on strictly 220-grain Krag bullets. Tradition and popular impressions are quite to the contrary, but they are wrong.

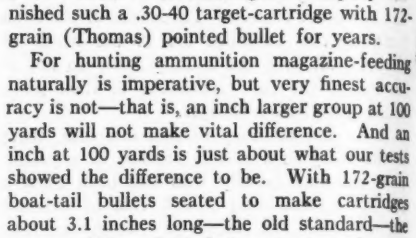
Measurement of the various bullets with micrometer showed that the forward edge of their .308-inch diameter came either 11/16ths or 12/16ths of an inch back from their points, with the exception of the 220-grain bullet, which was 13/16ths in this dimension. On the same bullets, for curiosity, we found their .301-inch diameters to be very uniformly well between 9/16ths and 10/16ths back from points. The .303 British bullet measured 9/16ths in this particular, and the rest varied only 1/32nd inch, with 10/16ths as maximum.

When such relation between modern pointed bullets and old .30-40 bullets was discovered, the next question suggesting itself was how their seating in case necks compared. We had their point length. Now how long were they from front edge of .308-inch diameter back to base? The 220-grain bullet, .30-40 standard, seats in a case one-half inch. Its .308-inch (diameter) length is 7/16ths, the crimping cannelure occupying 1/16th of length. The 180-grain spitzer is actually 1/16th inch longer in this particular than the 220-grain bullet. The ones measured had no crimping cannelure. The 174-grain 303 British bullet has 10/16ths length on this basis. The 150-grain and the 172-grain boat-tail bullets both show 5/16ths of an inch of this .308 groove-bearing length—that is, in the boat-tail bullet such length was measured from forward edge of its .308-inch diameter back to where the boat tail began. As 5/16ths is only a little more than half the base length of the 220-grain bullets, and about half the latter's case-neck seating, we readily could see how questions might be raised as to successful use of these bullets in .30-40 rifles.

At this point a little review of the facts and figures showed where we had arrived. All the bullets have virtually the same point length, varying by only 1/16th (except the 220, which varied ⅛ inch); hence all engage the rifling about equally, the only variation in this respect being that the pointed bullets engage it a little sooner and with less jump than the 220-grain bullets, when all of them are seated to make cartridges of standard length. When so seated even the 150-grain and the 172-grain boat-tail bullets had bearing in case necks upward of 6/16ths inch long, which is ample length. I think this last sentence will answer the main question in the minds of some thousands of Krag and Model 95 Winchester users. There is absolutely no reason why these latter two bullets should not shoot as well as, or better than, the 220-grain bullet in the particular star-gauged Krag rifle investigated, or in any others with interior dimensions close to standard.

To make the pointed bullets shoot still better, all that is needed is to close up that gap between bullet-groove bearing diameter and beginning of rifling in the throat of the rifle. In other words, eliminate the jump of 3/16ths inch mentioned a while back as noted in connection with the 220-grain bullets tried. To do this, of course, makes a longer cartridge—a cartridge too long to work through Krag and Winchester magazines. Yet, since it is fine accuracy for target purposes that we are seeking, we perhaps will not object to loading our cartridges singly, right into the barrel. There is no possible reason why this should not be done. The Remington Company furnished such a .30-40 target-cartridge with 172-grain (Thomas) pointed bullet for years.

For hunting ammunition magazine-feeding naturally is imperative, but very finest accuracy is not—that is, an inch larger group at 100 yards will not make vital difference. And an inch at 100 yards is just about what our tests showed the difference to be. With 172-grain boat-tail bullets seated to make cartridges about 3.1 inches long—the old standard—the average 100-yard 10-shot group proved to be around 2½ inches in diameter. A typical group of this loading is shown herewith. All its holes except one are within a 2-inch circle.



100 yds. F. A. 172-gr. Boat-tail Gilding Metal Bullet. 43-gr. No. 17½ Powder

In seating bullets for the long, single-loading target-cartridges, we experimented by letting the rifle bolt do its own seating, forcing a case up on a loose bullet. Both 150-grain and 172-grain boat-tail bullets were thus pushed into their cases about 1/16th inch of their .308-inch bearing. While these bullets were held firmly—too firmly to be removed with the fingers—more bearing in case-necks would be desirable. The bullet bases almost certainly will be canted to one side or another the few thousandths of an inch represented by the neck tolerance in the rifle-chamber. Bullets will be out of line by that much.

Still it is the exceptional target-rifle that does not have some neck tolerance and permit some decentering of bullets in its throat. Even though we know that a true line-up of bullet with bore is necessary for very precise shooting, we usually sacrifice a bit of accuracy possibility at this point in consideration of other difficulties, such as variation in thick-

ness of case-walls, variation in bullet diameters, and perhaps pressure complications. As one way of three-quarter elimination of the error in .30-40 handling of the 172-grain boattail bullets, however, it is practicable to resize the necks of fired cases for just an eighth of an inch at their mouths, leaving the rest of the necks fully expanded to fill the individual rifle-throat snugly, and so to hold the case in true line. Then if the resizing has been done truly concentric, bullets will be held up against the rifling with minimum error from line of bore. *This is the way to load .30-40 cartridges for maximum accuracy.* The cartridges are about 3.6 inches in over-all length, although this figure will vary and should vary in different rifles. Our tests showed a consistent grouping at 100 yards into only one and a half inches from such ammunition. When new cases were used which had not been expanded to fill the rifle chamber, thus permitting some decentering, groups enlarged at once to 2 inches.

For 200-yard work the velocity developed may be as low as 2,000 or 2,200 f. s., but for all longer ranges the 172-grain bullet ought to be driven at 2,500 or 2,600 f. s. Such speed discounts wind drift and other deviations. Use No. 17½ powder, 43 to 45 grains, depending upon your individual rifle, or use HiVel powder, 36 to 37.5 grains. If 180-grain bullets are use instead of 172-grain ones, use one grain less powder for them. For 220-grain bullets, use 40 to 41.6 grains of No. 17½ powder, or 35.5 to 36.7 grains of HiVel. Use these same powders in smaller charges for 2,000-foot loads. The above charges are safe in Krag rifles. Be very careful to use only fresh, dry, strongest primers.

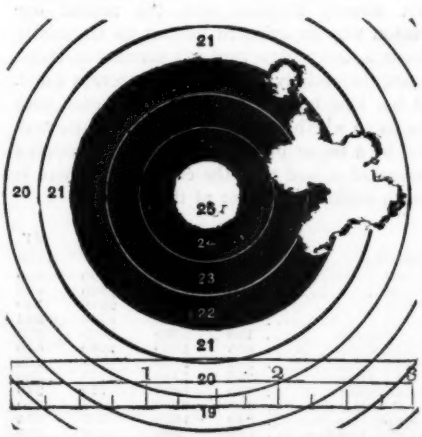
For most powerful hunting ammunition in normal Krag rifles use 180-grain Lubaloy or Bronze Point bullets with 39.5 grains of HiVel or 42 grains of No. 17½ powder. These loads develop velocities of 2,511 and 2,600 f. s., respectively, with pressures around 43,000 pounds. Of course 200-grain bullets may be employed, using 42 grains of No. 17½ or 37 grains of HiVel. For the 190-grain bullets (303 Savage, etc.) use 42.5 grains of No. 17½ or 39.5 grains of HiVel, giving about 2,400 f. s. velocity. For 170-grain .30-30 bullets use the same charges as for 172-grain target-bullets, or not to exceed one grain more. For the 150-grain bullets, of .30-'06, 300 Savage, etc., use 47.3 grains of No. 17½ to get 2,825 f. s. velocity, or use 42.5 grains of HiVel to get 2,750 f. s. velocity. In my opinion the 150-grain bullet at these speeds would make better deer medicine than the 180-grain bullet at 2,600 f. s. or slower; but the lighter, shorter bullet does not seat in case-necks so far. It will be noted that the 220-grain bullet is *not* here recommended for either game or target.

Because 150-grain bullets are obtainable cheaply, in full-jacketed style, and because Government No. 20 powder is also comparatively cheap when bought from the Director of Civilian Marksmanship or obtained through tearing apart war ammunition, many shooters want to use them together in .30-40. Neither are most desirable, particularly the powder; yet loads of 36 grains to 37.5 grains of this powder with this bullet are fairly satisfactory. The 37.5 grains give a velocity of about 2,350 f. s. With this load 100-yard groups averaged 2¾ inches wide by 3½ inches high.

Any of the jacketed bullets may be used in light loads for velocities of 1,800, 1,500 f. s. or slightly lower. The 180-grain bullet is the best. Charges of 16 grains bulk shotgun, 17.5 grains of No. 80 or 12 grains of Unique powder develop velocities in the neighborhood of 1,500 f. s. These are very useful and accurate loads for squirrels, rabbits, birds, short-range offhand practice and at tin cans in the air. Quite often no better loads, or rifles either, can be obtained for match-shooting within 50 or 100 yards. The absence of recoil and the fine grouping, together with ease of reloading, are important factors. With .30-40 rifles and this type of load shooters frequently win more turkeys or beef than they can with .25-20 or .32-20 rifles.

There are three other types of home loads that help to make the .30-40 an all-around cartridge hard to equal by any others of smaller size. These loads re indispensable for one or another kind of hunting, and they provide low-cost enjoyment plus value in practice that is never equaled with smaller rifles. First, there is that old Marine Corps load. It is based on the 87-grain cast bullet No. 308245, but also may employ B. & M. bullet 312100, and Bond C-311500. Powder charge may be 6 or 7 grains of No. 80 (or up to 9 grains), an equal amount of bulk shotgun, 4 grains of Unique, or 5 grains of No. 5. The bullet has to jump to engage the rifling, but the load is accurate despite that fault. A target made at 50 yards is shown herewith, the 10-shot group measuring an inch and a quarter, with nine shots within ¾-inch. For squirrel-shooting, for all 25-yard target and practice work, and for killing furred game in traps, or downed big game without shattering bones and meat, this load is better than any other. It is the farmer's hog and beef killing load. It is very cheap. It makes little noise. For some mistaken reason this load has been overlooked a great deal in late years, but it is worthy the attention of every .30-40 owner.

Then there is the old reliable 150-grain cast bullet load. Sometimes 125-grain bullets are used, but I see no use for them. If a shooter wants something lighter than the 150-grain ones—to equal a .32-20, we shall say—he should drop back to 87 or 100 grains. The 150-grain length suits .30-40 chambers better, anyhow, and makes a cartridge that parallels in power the old .32-40 black-powder rifle, famous years ago as a deer-gun and still found a desirable compromise by some men today. The .30-40 with this bullet at 1,450 f. s. gives all the accuracy up to 200 yards that .32-40 hunting-rifles give; kills the same game, and costs no more or costs less. Such a load has been used in past years by the million for National Guard and other Army practice and qualification firing. The old Ideal bullet No. 311150 is more modern and perhaps more desirable. Bond No. 311870 is also excellent. Use 14 grains of No. 80 powder, 14 grains bulk shotgun or 8 grains of Unique.



50 yds. 87 gr. Ideal Cast Bullet. 9 gr. No. 80 Powder

As an instance of the accuracy and enjoyable usefulness of this load, I can tell of an old dead tree that blew down during the past winter. This old tree stood at a distance of perhaps 325 yards from my house, on a hillside, and is about 14 inches in diameter at the butt. About ten years ago we fired at it extensively with this load in Krag rifles in the course of some experiments. When we missed it the fault was distinctly because the sight was not squarely on that trunk. Dirt would fly back of it. When we hit it, which was nearly always, a distinct knock could be heard floating back to our ears. Hardly a week has passed during the summers since that we have not sent up to the old trunk a few more of these or similar bullets from .30-40 or .30-'06 rifles. When it fell over the other day and split, the old trunk for about 5 feet of its length was filled with lead in thousands of bent and battered pieces and in chunks pounded and seemingly welded together by heat of impact. At a conservative estimate the 14-inch mark was hit 2,000 times out of 2,500 shots fired at this range of 325 yards.

And, finally, there is the .30-40 "Hard Times" load, so called because it will serve the purposes of full-power factory cartridges in all big-game killing, if required when factory ammunition is unobtainable. It is accurate enough to qualify a shooter with a high score in N. R. A. or Army courses of fire, and has been used by many regiments as well as civilian club members for the purpose. It is cheap enough to be used by the hundred at a cost of only a few dollars. It is fully as powerful as the .38-55 and kills as well on grizzlies as on ground-squirrels. Perhaps it ought to be compared with .38-56 or .40-60 Marlin in power, or with standard .30-30 soft-point cartridges. It is astonishingly deadly on ground-hogs. For this load you use a bullet weighing around 200 grains, with a gas check on its base to prevent the hotter, higher-pressure smokeless powder gases from melting it. You drive this bullet at 1,600, 1,800, even 1,900 f. s. velocity, and get a trajectory not very much higher than that of ordinary .30-30 factory cartridges. Ideal bullets No. 308284 or 308334 are the

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Heavy Hand-gun Notes

By Cecil H. Taylor

AS A BOY vacationing in the North Woods with my first real rifle, I was often tantalized by coming unexectedly and unarmed upon desirable game. Once, while cleaning fish at the edge of a lake some hundred or so feet from my tent and rifle, the finest moose it has ever been my fortune to see stalked leisurely and majestically from the woods some 60 yards away without noticing me, and, entering the shallow water, began calmly feeding. The lay of the land was such that no cover was available between me and my rifle. I began crawling slowly and painstakingly toward the rifle, keeping a watchful eye on the moose. When I was about halfway to my goal the moose decided to leave for parts unknown, and left the water, and climbed the bank and disappeared in the woods. He had apparently not seen me, but—he had gone.

That heart-breaking experience, and numerous others of similar nature, convinced me early that many fine opportunities must be lost to him who relies entirely upon the rifle in the woods; and that it was up to me to learn to handle and shoot the hand-gun. Since then, for some 30 years, I have practically discarded the rifle for woods shooting and camping. While few may be convinced of the reasonableness of this step, I think the following may interest some of my fellow powder-burners.

The hand-gun has, of course, two principal drawbacks as compared to its big brother—its relative inaccuracy and its relative lack of power. The first can be considered as a matter of range. We know that the pistol can be held into about the same or somewhat better group diameter at 50 yards than the rifle at 200 yards. The prevailing scores are, however, somewhat higher for the hand-gun, so that the true proportion is probably about three to one instead of four to one. It has been my experience in woods shooting that a majority of game is come upon at less than 50 yards, and seldom if ever at over 75 yards, unless across a body of water. I estimate the average range at which I have shot deer, caribou, moose and black bear to be about 30 yards. This would correspond in accuracy to the rifleman's 100 yards, a range which is generally considered safe and conservative. Furthermore, if we compare the accuracy *at the same range* of the *average* hunter with rifle to that of a *good* game shot with the pistol, I feel from what I have observed that the difference would be surprisingly little. It is my contention that the normal woods range is well within the limitations of hand-gun accuracy for all larger American *woods* game, provided only that the shooter understands his and the arm's limitations and is sportsman enough not to take undue chances of wounding without killing his game.

This, then, leads us to the second limitation—that of power. It is, perhaps, not generally recognized that in considering the effect of a bullet on game there are two possible measures for estimating "stopping power" or "shock effect." The first and usual one is that of projectile energy, measured by mass times velocity squared $\left(\frac{WV^2}{2G}\right)$. This figure of striking energy gives us a measure of the bullet's capacity to do destructive work either upon the target or upon itself, and hence measures its tissue-destroying capacity. It does not, however, directly measure the blow struck in terms of momentum, or tendency to move the target bodily along the projectile path. Thus a .30-'06, 150-gram bullet moving 3,000 foot-seconds has the same energy—3,000 feet x pounds—as a one-hundred-pound object moving at 30 miles per hour. Both projectiles are capable of the same destructive effects if the energies are similarly applied; but the body of the man hit by the bullet would, if the bullet lodged in his body, be moved approximately as it would have been moved by the recoil of the gun that shot the bullet had he himself fired the gun. On the other hand, the man struck squarely by the hundred-pound object at 30 miles per hour (44 foot-seconds) would be flung bodily in the direction of the blow at a velocity of 17 foot-seconds (11 miles per hour). The local destructive effects accompanying the blow, if concentrated on a .30-caliber spot, would be quantitatively equal to those caused by the bullet. It requires no argument to establish the greater instantaneous *disturbing* effect or "stopping power" of the heavier, slower-moving mass, even though the *destructive* effects and energies are the same.

We have thus two factors in estimating the effect of a bullet on game—the tissue-destroying effect, measured by $\frac{WV^2}{2G}$, and the body-moving effect, measured by momentum MV. Where the energies of two bullets are equal the momenta, or body-moving effects, are proportional to the square-roots of the bullet weights.

The above physical laws will explain to those not already familiar with the matter one reason why experienced hunters so frequently select a heavy, slow load at a sacrifice in bullet energy, especially for large or dangerous game. It has long been a matter of speculation with me as to whether, perhaps, the MV figure may not be a better indication of the real stopping power of a load than the energy, and there is much evidence in favor of this view.

Cartridge	*Bullet Weight*	*Velocity*	$\frac{WV^2}{2G}$	$\frac{MV}{1000}$
.30-06	150	3000	3000	450
.30-06	180	2725	2960	490
.30-06	220	2450	2920	540
.30-30	170	2020	1540	344
.250 Savage	100	3000	2000	300
.45-70 black	405	1360	1660	550
.44-40 black	200	1300	750	260
.38-55 black	255	1440	1270	366
.32-40 black	165	1450	770	240
.45 Colt Revolver	200	1150	585	230
.45 Colt Revolver	240	1060	597	254
.45 Colt Revolver	280	980	598	275
.45 Auto	200	925	380	185
.45 Auto	230	815	340	187

The above table of energy and momentum figures for a few loads may be of interest. For convenience the momentum figures have been divided by 1,000, which does not change the comparison values.

From this table we see that the .45 Colt revolver with maximum loads has about one-half the momentum and a little less than one-quarter the energy of the Springfield rifle. According to my view this means that we can expect one-half the instantaneous stopping power with one-quarter of the tissue destruction from the hand-gun that we would get from this rifle, which is considered by most authorities to be excessively powerful for most American woods game.

Another point which does not seem to be clearly realized by riflemen is that all the energy used in deforming the projectile on impact is entirely lost in so far as tissue destruction is concerned. A bullet can dissipate its energy either entirely into the target, as is the case when it is fired into water, or it can consume this energy in destroying itself without effect upon the target, as is the case when it strikes against a hardened-steel plate. In game-shooting the energy is usually expended in both ways, partly in tissue destruction and partly in bullet deformation. Every bit of energy absorbed by the bullet in distorting its original shape must be taken from the energy available for destructive work upon the game.

An idea of how much energy can be absorbed in distorting the bullet itself can be had from an examination of bullets which have been fired against boiler plates. Take, for example, any of the larger pistol cartridges, such as the .44 Russian, .44 Special or .45 Colt, having energies in the neighborhood of 300 foot-pounds. When fired against ½-inch steel plates, which absorb little or no energy from the bullet, the latter is found to have broken up into from five to fifteen fragments and a central base portion. This destruction represents the greater part of the 300 foot-pounds energy of the bullet, though an unknown percentage remains in the flying fragments which move radially from the point of impact. Pistol bullets usually deform very little on animal tissue and seldom penetrate over 18 inches, thus enabling their relatively low energy to be utilized very efficiently.

The above may at first sight seem opposed to the well-known fact that mushrooming bullets are especially destructive. The contradiction is, however, apparent. While expansion of a high-power bullet in the wound absorbs a small fraction of the total energy available, the increase in effective bullet diameter enables the greater part of the energy to be delivered to the tissue within the zone of vital organs. Where large energies are available and the vitals of the game not too well protected by hide, bone and muscle, the concentration of energy in the vital organs, due to

bullet expansion, will more than balance the relatively small energy loss in upsetting the bullet. Where bullet energy is low, as in pistols, it becomes necessary to avoid all power losses, and therefore bullet deformation. To get the required concentration of energy expenditure within the first 10 or 15 inches of tissue penetration a large-diameter bullet is required; hence the effectiveness of the .45 caliber.

From this we see one reason why the small-bore, high-velocity rifle-bullet, with low MV figure and insufficient jacket strength to resist fragmentation, does relatively little damage. The energy absorbed in bursting and tearing up the bullet itself is so great that little is left over for tissue destruction; and this remainder is deflected more or less radially from the bullet path, so that there is but slight penetration though considerable superficial damage.

There seems to be a wide divergence of opinion between authorities as to the influence of the barrel length on both accuracy and velocity. In the June issue of THE AMERICAN RIFLEMAN Major Hatcher estimates the velocity difference between the 5½ and 7½ barrels in the larger revolver-cartridges as about 25 foot-seconds. In a recent booklet issued by the du Pont Powder Co., Wallace H. Coxe, a ballistic engineer, states that in pistols and revolvers each inch of barrel length gives from 50 to 75 foot-seconds increase, so that the 7½-inch barrel should give from 100 to 150 foot-seconds higher velocity.

I have had little opportunity to obtain any exact figures of this nature with modern smokeless powders, but in some work years ago at Frankford Arsenal I found a difference of about 80 foot-seconds between the two lengths mentioned, using black and semismokeless powders in heavy loads. At that time I also investigated the effect of leakage between the cylinder and barrel, with the result that I found that for each one-thousandth of an inch spacing at this point a velocity drop of from 5 to 8 foot-seconds could be expected. In other words, reducing the space from .012 to .002 inch would increase the velocity from 50 to 80 foot-seconds.

All such results depend upon the precise conditions, and no exact figures for general use can be obtained. For instance, the longer barrel will gain more from closing up the spacing than a short barrel; and the longer barrel gives its greatest advantage with the heaviest charges. I believe in the long barrel, both from the consideration of power as well as of accuracy. For holster carrying in the woods I can find little advantage in convenience or handiness of the short barrels.

The above considerations, together with my observations in hunting, have led me to pin my faith to the old .45 Colt cartridge, either as loaded by the factories with 40 grains of FFG black powder and 250-grain lead bullet, or with various smokeless and semismokeless hand-loads, with bullets up to 285 grains. With these latter it is possible to develop energies up to 600 foot-pounds, with momenta of about 280,000. Both these figures are about the same as those of the .44-40 Winchester rifle with black powder, a combination which has probably accounted for more big game within the United States than that of any other rifle and cartridge.

It would therefore appear that the heavy pistol is not so much of a toy as some of our eminent rifle authorities would have us believe. In spite of its relatively low power it utilizes its projectile force more efficiently than does the modern high-velocity rifle. While the projectile energy available may be less than one-quarter that of the Springfield, the bullet wastes little of this on self-destruction; and the momentum figure, which is more nearly a measure of instantaneous shock than that of energy, is about half that of the rifle.

I do not wish to be accused by some well-meaning brother of holding the opinion that the hand-gun is the equal of the long gun in either power or accuracy. My position is this: that the hand-gun, when worn habitually, gives a man living in the wilds, and especially if those wilds be densely wooded, about twice the opportunities that come to him who relies upon the rifle, and that these extra opportunities about offset the greater efficiency of the rifle where reasonable skill with the pistol has been developed. Personally I regard the revolver, *as I use it*, about as I regard the barbless fly in fishing. I would prefer to get one good specimen of game with the hand-gun than two with the rifle; but this, I recongize, is a matter of taste or viewpoint. I take no more chances of wounding or losing game than I would with a rifle, because I deliberately refuse shots which I think doubtful, just as any sportsman abstains from any abnormal risk of inflicting useless suffering. In proof of this I can truthfully state that only one piece of game has ever escaped from me in a wounded condition, and this an exceptionally large buck shot with a .45 Automatic at about 80 yards—a shot I now recognize as having been unwarranted.

And now for a few words on the subject of the gun itself. For me—and this again is a matter of taste—there are only two suitable guns: the Colt Single Action, with 7½-inch barrel for hunting, and the Colt .45 Auto for defense in civilization on the rare occasions when toting a gun seems advisable. For general "tin-can" pratcice the Reising Auto is my choice. And now for the reasons why:

Since 1894 I have been constantly collecting modern pistols, and using them at the range and in the woods. I now have some 80-odd modern pistols and revolvers in my armory, so that I can speak without the prejudice of one who has not tried nearly all of them. In a hunting-pistol I desire a combination of the utmost reliability, accuracy and power, named in the order of their importance. By reliability I have in mind that quality which will enable an arm to stand the type of abuse which it may get in my service, and be easily dismounted for adjustment or replacement of aprts in case of trouble. On a number of occasions I have dropped my gun overboard from a boat or canoe, or had it pulled from the holster by brush during an awkward climb, to find it well battered by falling against rocks. For withstanding such service, or rather abuse, I am convinced that the S. A. is superior to any other hand-gun in the world, though the New Service is not far behind. The difficulties I have had with the latter are: the liability to spring the "crane" on which the cylinder is mounted if the gun is dropped so as to strike a hard blow on the right side of the cylinder; and the liability of the trigger not to go forward to its normal position so as to operate the cylinder stop and hand. This has occurred with me on two occasions, due to dirt in the action. As against this defective operation of the N. S., I have never had a failure of the S. A. except those due to breakage of parts and I think I have finally found how to prevent the breakage of the only two parts of the S. A. which are at all likely to break—the cylinder-bolt and the bolt and trigger spring. The first is overcome by a handmade part of somewhat different design; and the second by a double, laminated spring of thinner section. With these changes the S. A. is, in my opinion, perhaps the most reliable firearms mechanism of which I have any knowledge. The hammer is heavy enough to give certain ignition with heavy primers, the use of which with heavy loads obviates the blocking of the cylinder due to the primer metal blowing back through the firing-pin hole. The frame will, I think, stand a heavier blow without throwing the barrel out of line than that of the N. S. There is no danger of foreign matter getting under the crane and disturbing the chamber alignment as in the N. S.

The question of power is closely allied to that of accuracy, for as power increases accuracy decreases as a usual thing. I refer, of course, not to the potential accuracy of the arm in a machine-rest, but to that of the arm in the hands of the hunter. One of the most important points tending toward accuracy with heavy loads is the grip. To me the S. A. grip is about perfection for heavy-load shooting. The Bisley grip would be better were it not for the bad position of the trigger when the hand is placed high, as intended. The Bisley grip can be reworked to an ideal shape, but it requires a first-class metalworker to do this. As it stands, the S. A. has a far better heavy-load grip than the N. S.; and I believe a large proportion of those who have used the two guns for really heavy charges agree with me in this. As to actual target range accuracy, the N. S. has undoubtedly a slight advantage, owing to its shorter lock time; but this is negligible when using heavy loads, since it is more than offset by the grip. As to the inherent accuracy of the two arms, they should be equal with the same cartridge and barrel length. The double action of the N. S. is of no importance to me at all, as it never would or could be of practical use with any but relatively light loads, and with these its utility is questionable. It merely serves to complicate the mechanism.

While speaking of grips, it seems paradoxical that two such entirely different grips as those of the S. A. and .45 Auto could fit the same hand as perfectly as they do mine. While the grip diameter of the latter is a trifle large for me, the feel of the grip is secure and firm, with no sharp edges or "high spots"

to annoy me. The old S. & W. Russian model also had a delightful feel; and this gun is for me by far the best of the target-guns for deliberate firing. But its grip lacked one thing—the ability properly to distribute heavy recoil in my hand. For the relatively weak Russian cartridge it was ideal; and it was no uncommon thing in the days of Patridge, Anderton, Bell and Keough at the Walnut Hill range for us to shoot 100-shot scores with this gun in an afternoon, without discomfort. But for real hunting loads such as can be crammed into the .44-40 and .45 Colt cases, the grip left much to be desired, and I was forced to the S. A. Colt for this reason. With this arm my capacity to stand recoil is as great as or greater than the maximum load capacity of the gun; and this is a most important point in that gun's favor.

As to the reliability of the Colt Single Action, much has been written and more spoken, but perhaps a few additional words will do no harm. I have seen just six types of breakage (apart from bursts) in this arm: 1 mainspring, 1 trigger, 4 cylinder stop-bolts, 1 pawl (hand), 2 pawl-springs, and 6 stop-bolt springs. I do not count broken hammer notches, as they are of little or no importance in the operation of the arm. These failures occurred on a number of different guns and represent not only a great number of shots, but also an incalculable amount of abuse of every nature. My personal experience covers about 30,000 shots from five of these guns, an includes 3 broken stop-bolts, 3 stop-bolt springs and 1 mainspring.

Apart from actual breakage I have never seen a failure to function properly in a Colt S. A., except where such failure was definitely due to defective ammunition or to excessive foreign obstruction. With respect to the effects of rust and dirt upon the action, I have never found another arm that would compare with this one, owing to the simplicity and ruggedness of its parts, and especially to the power of the several actuating-springs.

A little trick for preventing the breakage of flat springs in any arm may be mentioned here, as it is especially applicable to the S. A. Take a thin sheet of hard fiber, about 1/64 inch thick, and cut out two plates or washers to fit over the spring-securing screw, against each face of the spring. Assemble the spring so that it is held between the fiber plates and does not touch the surrounding metal at its base. This simple form of insulated, non-metallic spring seat will reduce spring breakages to a small percentage of normal. This idea can be applied to both the bolt-and-trigger spring and to the mainspring of the S. A., with fine results.

To sum up for the S. A.: I believe this gun combines to the highest degree reliability, killing power, accuracy and "fit"—the four prime requisites in a hunting hand-gun.

Coming now to the "defense" gun, I doubt if there is any reason for adding to the pean of praise of the U. S. Colt Auto which so many have sung since the war. My own experience with it has been quite extensive, and I consider it certainly the best of automatics. It is neither as powerful nor as accurate as the fully loaded .45 S. A., nor is it quite as reliable, in my opinion. The 230-grain ball at 800 foot seconds is far less shocking than a number of revolver loads when fired from a 7½-inch barrel. I have never been able to score over 82 at 50 yards with the automatic, and somehow can not feel the same confidence in its accuracy as I should like to feel. Government test figures seem to show a larger mean radius than would be permissible in a really accurate revolver. Even on apparently perfect holds 7's and worse result in my hands. At one time I concluded that there were certain points of construction and fit which, if properly adjusted, would produce a really accurate gun. I now feel that is largely my own fault.

There may be some little peculiarity of holding or pulling which spoils my scores with this gun. But after watching the National Matches at Camp Perry in 1925, where the highest individual deliberate fire score was 89, I am forced to conclude that the average .45 Auto is not a target-gun, even though an occasional individual pistol may be produced that will shoot really close. It seems to me that the chambering of the barrel is normally so loose as to preclude anything like accuracy of the target type, or such as the cartridge is capable of. This loose chambering is undoubtedly necessary to ensure reliable functioning of the arm, and therefore can not be avoided; but it appears to reduce accuracy to a point where it is insufficient for a good hunting weapon, though ample for self-defense or military purposes.

As to the reliability of the .45 Auto, my experience, covering some dozen or more guns and about 7,000 rounds, leads me to the belief that this is very high. With the exception of an occasional defective gun, damaged magazine or faulty ammunition, I should estimate the functional failures of this type at less than one in a thousand shots. As to the liability of failure of component parts, I have myself seen failures of the following parts: extractor, disconnector, firing-pin, slide-stop, link, slide, hammer-strut, barrel-bushing, firing-pin stop and magazine-catch. These failures have been so evenly distributed over a number of guns that I feel they do not indicate any inherent weakness of design but merely the normal breakage risk inseparable from any mechanism of this character. From my rather limited experience with this model I am inclined to estimate its reliability in defense service, where it will have some little care and will not be subject to the extreme abuse of wilderness hunting conditions, to be about on a par with that of the S. A. under woods conditions. The possibility of failure in either case is so remote as to make it negligible.

If we now consider the rapidity of aimed fire, the Government model is distinctly superior to any other heavy-caliber pistol. The softness of its recoil, short sight-base, short, direct trigger-pull and spur-grip all combine to make it a very perfect instrument for this purpose. For carrying in civilization its compactness is a great convenience. Some there are who object to so heavy a caliber for this purpose, but I can not agree with them. A gun is seldom if ever needed; but when it is called upon it should be capable of the greatest possible shocking and stopping effect. The .45 Auto is none too heavy in my opinion, especially for winter work in cold climates, where heavy clothing and perhaps even a fur coat may be worn by one's opponent.

Few people realize the shock-absorbing capacity of a number of layers of soft, elastic cloth, especially against a relatively slow-moving large-caliber ball; yet this large-caliber bullet is necessary to produce the required shock when the hit is not in a vital place. We must remember that defense shooting usually occurs at night, without sighting and sometimes when facing another's fire—a condition which does not tend to target accuracy. For these reasons I feel that it is well to have every available ounce of shocking power combined with rapid and sustained fire capacity. The eight shots available in the .45 Auto, combined with its stopping power, speed, reliability and convenience, make it, in my opinion, the best existing weapon for defense.

Meet An Old Friend Brought Up to Date

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kind to employ, and B. & M. 311190. Bond offers none with gas check. Use Lightning powder, about 21 grains giving 1,820 f. s. velocity; or use 25 grains of No. 18 or 28 grains of No. 17 to get around 1,750 f. s. velocity. HiVel also is good in 25- to 29-grain charges. These loads kick a little, and they deliver the goods at 200 and 400 and 500 and even at 600 yards.

Well, I have made a good strong case for the .30-40? It is an old cartridge, regarded as obsolete by many, but just review its strong points. Thanks to modern powders, it comes in loads almost as powerful as .30-'06. It handles smokeless powders so efficiently that maximum velocity is obtained from minimum powder charges. It handles with beautiful precision all the big and little hand-loads, which are cheaper than old black-powder ammunition used to be. Its rifles cost less than any others, little or big; and if a person care to go to the trouble, these may be made very light and handy. And for target work a good .30-40, properly loaded, still wins in fast company.

SOME .30-40 BALLISTICS

	Velocity			*Ft. Lbs. Energy*		*Trajectory Midway of*				
	At	*At*	*At*	*At*	*At*					
Load	*Muzzle*	*100 yds.*	*200 yds.*	*Muzzle*	*100 yds.*	*100 yds.*	*200 yds.*	*300 yds.*	*400 yds.*	*500 yds.*
30-40-180	2,500	2,410	2,200	2,490	2,050	.7	3.2	7.9	15.4	26.
30-40-220	2,000	1 863	1,590	1,970	1,600	1.2	5.4	13.6	28.	50.5
30-40-220	2,200	1,940	1,812	2,370	1,834	1.0	4.5	11.	22.	38.5
30-40-150	2,700	2,465	2,244	2,425	2,024	.7	2.9	7.5	14.	24.5
30-40-150	2,825	2,600	2,400	2,600	2,175	.6	2.5	6.2	12.5	21.8
30-40-150	1,450	1,200	1,040	700	460	2.5	12.	32.	65.	100.
30-40-200	1,800	1,525	1,240	1,500	1,117	1.8	6.	16.	32.	62.

Lighting The Fire

By J. C. Gray

THERE is a verse which ends—never mind how it begins—something like this: "Civilized man can not live without cooks." Now you may say, "What has that to do with rifles, ammunition and such?" Of course the answer is: no fire, no cooks; no fire, no firearms. In each case fire is necessary before we can have our favorite cooked food, or firearm.

Again, there is some similarity between the kitchen range and the gun, because with each there must be something to burn, and something with which to begin the burning. Eventually this will turn out to be a story about starting the fire; but before we go into that let us very briefly go over the different kinds of fuel for firearms about which we know something.

All fuels, when they burn, give off heat and gas; and gunpowder, no matter of what or how it is made, is no exception. Because we use gunpowder to push a bullet through the bore of a gun, we call it a "propellant." Nevertheless, the heat and gas from the burning powder are what do the work. Moreover, the heat helps a lot, because it causes the gas to expand—that is, to want to fill a larger volume, much larger than if the process of conversion from solid to gas were accomplished without heat.

As everyone knows, the first gunpowder was what we now call "black powder." It was probably first prepared in China, somewhere about 600 A. D. Its first use was not as a propellant, but as an unextinguishable—that is, not to be put out—fuel. It reached Europe, probably through the Arabs, perhaps about the year 1000 (nobody knows for sure), and was used to fill fire-pots and similar missiles to be thrown at an enemy's city or town by means of catapults or possibly by hand.

The first authentic record definitely relating to black powder about as we know it credits the stuff to a Franciscan monk, Berthold Schwartz, of Freiburg, in what is now Germany, about 1320. There is a record also that, at the siege of Alicante in 1331, the Moors used gunpowder as a propellant in firearms from which stone balls were projected by means thereof. In 1356 the city of Nuremberg used firearms to fight its battles, and we find them in use in Perugia, Italy, about ten years later.

From that day to this there has been practically no change in the components of black powder. It is, and was, a mixture of saltpeter, sulphur and charcoal, the proportions having varied from early times to the present about as in the table:

	Old, per cent	*Present, per cent*
Saltpeter	42	75
Charcoal	29	15
Sulphur	29	10

Smokeless powder is an infant compared pared with black powder, for it really dates only from about 1880, when Vielle, a Frenchman, worked out a process for what is called "colloiding" guncotton, to form a powder that would burn and not explode like dynamite. Guncotton resulted from the experiments of Schoenbein (1845) on the treatment of ordinary cotton with nitric acid. Colloiding is a process by means of which a fibrous or other rough material is mixed with ether, alcohol, acetone and the like, and finally formed into a horny substance similar to celluloid. It would take a book to tell all there is known about smokeless powder, and probably two or three more to explain the many things we don't know about it.

For the benefit of those who want to know what smokeless powder is made of, we can say that, in general, it is a colloided compound of nitrated cotton, either straight or mixed with nitroglycerine, together with other things such as stabilizers to keep it from deteriorating (diphenalamine being one); tin, to prevent metal fouling, and other chemicals with unpronounceable and unmentionable names to make it hard to ignite, to slow down the rate of burning, to make it burn rather cooler than usual, and—whatever else the bright young men at the powder factories can think of.

The big difference between smokeless and black powder, aside from fouling and smoke, is that generally with black powder of a given grain size the rate of burning is practically constant, regardless of pressure, while with smokeless powder we must develop a certain pressure in order to insure that it will all be consumed and not leave unburned grains in the bore to cause us trouble. Again, it is easy to start black powder to burning, but comparatively hard to do so with smokeless.

It seems worth while here to say a word about handling powders; and that is, if you do hand-loading, and have visions of imitating the prophet who is alleged in the Good Book to have mounted to Heaven in a fiery chariot, just keep on smoking your pipe or cigarette as you load, and eventually your vision will be realized.

Having very sketchily described what it is that we expect to burn, we can now begin the tale of how the fire may be started. Going back once more to the dim and distant past, and considering what we can find out about starting our fire, we are somewhat in the same fix as the man who wanted to know which came first, the hen or the egg. Carefully avoiding any discussion as to how our first fire was started, we will assume that we have a fire-pot and an ancient firearm; the fire-pot all-same small boy with a tomato can on a wire, said tomato can having a few holes in the bottom thereof and a small fire of sticks therein.

Having located our object desired to be frightened, and with reasonable hope, damaged upon discharge of our weapon, we point same in what is judged to be the proper direction, hunt around in our fire-pot for a blazing twig and apply same to the touch hole of our gun. After a reasonable interval we pick up the pieces and proceed to do it all over again.

Later on, the fire-pot still being retained, the use of a metal rod therein seems to offer promise that the elusive twig will not have to be sought so carefully. With both methods a barrel was used, having near the bottom (breech) a hole perpendicular to the axis of the barrel, and known as the touch hole, which outside expanded into a touch-pan, a funnel-shaped cavity for the reception of the priming. In contact with the blazing twig or glowing metal the priming was ignited, the flame passing through the touch-hole and igniting the propelling charge. Priming and propelling charges both were of the same type—in fact, priming was often done by forcing some of the regular charge through the touch hole into the pan.

Originally that is the way it was done. Later on, about 1375, different forms of what were called "matches" were introduced. These were used in a similar manner, but were more convenient in that it was not necessary to tend the fire. All that was required was for the gunner to blow on his match, just as we used to blow on our punk on bygone Fourths of July. Typical matches were made of spun hemp yarn soaked in lead-sugar solution, and soft wood sticks boiled in a solution of lead nitrate.

With these old weapons the marksman in order to fire had to look away from the target and at the match and touch-pan before firing. As a result it was very much of a guess whether he would hit the mark or not. Just imagine lining up your sights on something and then having to look elsewhere for perhaps half a second while you pulled the trigger. Not so good, is it?

Well, the ancients—our ancestors—didn't think so either, and finally some one of them found a remedy. Still using the old match he evolved a bent iron shaped somewhat like a crescent, one end of which was pivoted near the touch-pan, while a slit at the other end held the match. When it was desired to fire the match was pressed down into the priming, and all desirable things followed. This happened in about the first half of the fifteenth century (1420-1440). This iron was called the "cock." Later on the lower end of the cock was prolonged to form a lever (the trigger), and finally a spring was introduced to hold the cock in position and keep the match from dropping of its own weight into the priming. This is briefly the evolution of the match-lock, which was completed toward the middle of the fifteenth century.

In order to protect the priming from moisture the touch-pan was equipped with a cover in the form of a rotating lid, which was opened by the trigger at the same time that

the cock was let down. Finally a spring was added which, on release by pressure on the trigger, brought the cock down in a single swift movement, and thus the snap-lock was born.

In all of these methods of starting our fire you will see that it was required to have actual fire to start the desired conflagration. As a result it was always necessary for the marksman to carry a glowing match. This was rather hard on the ambitious hunter or soldier who wanted to use his gun in the rain.

About that time, say 1500, fighting was the principal occupation of about a third—shall we say the upper third?—of the population of Europe, while the other two-thirds didn't count. As a result much thought was given to means of getting the edge on the other fellow. Among the chief benefactors of the fighters were the monks, and no doubt many a retired fighter, turned monk, spent long hours in musing on his old trade. Be that as it may, the monk Schwartz is credited by legend, probably in error, with still another advance in the art of weapons, which actually arrived in the year 1500, or thereabouts.

This amounted to nothing more or less than the very radical idea of not having the fire until it was immediately required, and of getting it by means of sparks struck from a flint, or from pyrites. The first lock so far as we know on this principle is on what has been called the monk gun. It carries on the left side of the tube a rather long box, into which the touch-hole opens. In this box a file-shaped rod can be moved back and forth against a flint, which in turn is held against the file by a spring. As the file-shaped rod is moved sparks from the flint are evolved, and ignite the priming powder in the box.

By some stretch of the imagination we can see here a beginning of our present system of ignition, in that the fire was started by what practically amounted to percussion. However, it was a long time, just about 300 years, before Forsythe, the Scottish minister, invented the percussion system, which is the parent of our present type. It is interesting to note how the clergy were active in this matter. May it not be proper to wish that we had more of that kind nowadays?

From the straight file of the monk gun evolved the bent file, which later became the basis of design for the wheel-lock which was completed toward the middle of the seventeenth century (1640-1660). The wheel-lock comprised a file or knurled-faced steel wheel passing through the bottom of the pan, and a cock carrying a piece of iron pyrites in the slit. On bringing down the cock on the priming, the wheel, actuated by a spring, was released by the trigger and struck sparks from the pyrites, ignition usually following. By the way, pyrites is the same stuff that is used to make sparks in the modern cigar-lighter.

About the same time the percussion snap-lock arrived. The first of these were like the match snap-lock. The released cock, holding the flint or pyrites, struck on the roughened area in front of the pan, which as in the match-lock was closed by a rotating lid. Toward the end of the sixteenth century the percussion area was combined with the cover in a single piece; and finally the flint-lock, as used up to the middle of the eighteenth century, was developed.

In all the methods of ignition which have so far been described the fire was started by flame or sparks generated outside the gun, and applied to powder which was actually not in the barrel. There were complicated mechanisms to maintain, flints to be supplied and a dozen other things to be thought of, and at best the action was slow and subject to misfires. An estimate of misfires under normal conditions with the flint-lock has been made at about fifteen in a hundred shots. How you would howl if fifteen out of every hundred cartridges in your pet gun failed to fire!

What was wanted, and badly, was something that would be sure fire, and simple; and it took chemistry and chemical science to solve the problem. The discovery of the French chemist Bertholet (1786) that chlorates mixed with combustible substances will ignite on being struck, and the discovery of mercury fulminate in 1799 by Howard, an Englishman, led to the manufacture of so-called chemical locks, in which the fire jet for ignition of the powder charge was produced through impact upon a sensitive composition.

This is the source from which all priming compositions as they are known today have been evolved. The most celebrated of the earlier investigators and inventors in this line is Forsythe, the Scotch clergyman who was previously mentioned. The first patent for a rifle with percussion ignition was taken out by him in 1807.

In this type of gun the priming mixture, comprising potassium chlorate, sulphur and coal, was moistened and grained like gunpowder, little pellets being formed and coated with varnish or wax to protect them from moisture. In the Forsythe gun these pellets were contained in a magazine-lock, which permitted the firing of a number of shots. Forsythe's magazine-lock was not a success, by reason of the fact that it was dangerous, the fire from one little percussion pill frequently igniting those in the magazine. England after some years recognized the worth of Forsythe's invention by granting him a pension. What a wonderful example for our own solons!

It is almost impossible to trace the development of the modern types of priming without saying something about guns; hence much of what has been and will be said relates more to mechanics than chemistry, because, as you will remember, the chemist didn't come into the picture until about 1800, and that is relatively only a little while ago. What I want to point out is that there is a marked difference between the chemical and the purely mechanical systems of ignition.

In all the old mechanical types there were generated sparks, out in the open mostly; and these in turn were applied to the powder charge (all this relates to small arms), while in the chemical igniter we have a substance which percussion will light, together with something combustible like powder, to light on being struck and give a hot jet of gas to set our powder fire to burning. Early percussion mixtures, 1810-1830, were made of black powder and potassium chlorate in varying proportions; and sometimes they contained also mercury fulminate.

For a while there were practically two distinct lines of development, one leading up mechanically to the needle-gun of Dreyse, in Germany, and the Chassepot, in France, the other to the type of arm of which the original Sharps rifle was a good example. Both were possible, however, only because the chemists had discovered percussion priming mixtures.

Going back to the needle-gun type, in 1810 Lepage patented a lock, with covered pan which rested upon a perforated nipple. Through the cover passed a percussion-pin, held in place by a spiral spring, and this pin was driven by the cock into the priming material. Lepage's lock was later (in 1820) the basis of a design by the gunmaker Dreyse, of Sommerda, in which a needle was driven by the cock into the detonating composition in the powder-chamber, thus setting off the charge. It is said that this invention was the result of an accident, when one of Dreyse's workmen carelessly pushed a needle into some priming mixture. Later the priming-mixture pellet was placed in a paper cartridge with the powder; and the needle, driven by a spring, started all the trouble. I think that this needle-gun cartridge is the first in which primer, powder and bullet were all combined; hence the breech-loader.

About the same time that Dreyse was experimenting with needles, an Englishman, Egg by name, in 1818 (and some say an American, contemporaneously) invented the percussion-cap. In this a priming mixture was placed in the bottom of a copper cup; and—but why go on? You know all about caps. Anyhow, we did have from then on percussion-cap rifles; and when Colonel Colt made little men as good as big ones, cap-and-ball revolvers.

Egg's primer compound, as nearly as we can tell, consisted of potassium chlorate, 70 per cent; sulphur, 18 per cent and coal or thereabouts, 12 per cent. A search of the United States Patent Office files on primer compositions from about 1850 to date reveals so many of these that it would be a shame to discourage you by telling about them. Suppose we had all they proposed and patented in England and France, to say nothing of Germany, where chemists flourish and grow fat!

Well, along about 1860-1870 several brilliant minds all at once conceived the idea that we might put cap, bullet and powder charge in a metal container, and hence the present form of metallic small-arms ammunition.

Now that we have told you, not all we could find out, but only a part, concerning the origins of the modern cartridges, ignition especially, it may be in order to take up the latter subject from the present-day standpoint, and in greater detail.

(To be continued)

Handloading Shotgun Ammunition

By Capt. Chas. Askins

I HAVE been loading shotgun-shells ever since the advent of smokeless powder, and for a good while before. In the early breech-loading days about everybody did that, and I can remember the time when I shot away my fifty brass cartridges, all I had, during the day, and loaded them at night, using a loading-block, a rammer and a mallet. Those old brass shells, with no crimp, had to have wads two sizes large, and we thought the wads had better be put down firmly, hence the hammer. I also very well recall the first smokeless powder that I shot—"wood" powder. A friend loaded some cartridges for me with this powder, and insisted that I use them on a snipe-hunt. I wanted to make a good showing that day because there were some good shots in the "gang." I didn't. Some of those shells fizzled, some of them squibbed and occasionally one shot all right. Some of those shells wouldn't have killed a snipe at 15 yards, tied. Later, we learned to put in a black-powder priming.

It is not difficult to load shotgun ammunition today. The machines have nothing on a hand-loader, if he knows what he wants to do, and does it. The machines measure the powder and drop it, place the wads and put them down with a certain amount of force, measure and drop the shot, wad, and crip it. All this can be done just as well by the hand-loader, except possibly the crimping, where machines usually have some advantage. The big machine men have the further advantage of being able to read their cartridges ballistically.

Powder lots differ to some extent, which the machine ballistician discovers with the first box of cartridges loaded, and the hand-loader doesn't discover at all. Machines do not load a given amount of powder, but load a given pressure—all beyond the province of the hand-loader. However, the latter can put up special loads which are not to be bought, and he can fit his gun, which no machine can do, because the gun is an unknown quantity. Moreover, the big powder companies are much more careful as to the lots of powders put on sale to the public than they are with the lots furnished for machine loading, knowing that the machine men will have a remedy for an odd lot of powder right at hand, while the hand-loader will go along in blissful ignorance, and may develop dangerous pressures.

To begin with, certain principles of powder action ought to be known, and generally are not known. Every now and then the query reaches me as to how long a shotgun-barrel ought to be in order to burn one of these big charges of Progressive powders. Now listen. The one undeviating principle that governs is that the bigger the load of powder and shot the quicker the powder will all be consumed, and the shorter the barrel in which all the powder will be burned. I'll just end the paragraph with that, so that you may remember it.

Powders differ, of course, as bulk, dense, and progressive—differ in every respect that a big load of powder, with a like load of shot, will burn cleanly in a short barrel, whereas a light load of powder and shot demands long barrels. Just what is a light load and just what is a heavy load depends upon the powder used.

All this was not true of black powder, but we will have to get clear away from anything that black powder taught us. The reason big charges of powder burn quickly and light charges burn slowly, is that the big charge makes a big, hot fire, and the small charge makes a smaller fire with less heat. Sweeley took Ballistite and put enough powder into the shell so that with a standard load of shot all the powder was consumed within the first 10 inches of barrel length. Then he took the same powder and the same shot charge and put in a light enough load of powder so that some of the powder was unconsumed in 24 inches of barrel length. It is this feature of powders which makes overloading dangerous and underloading ineffective.

We have three classes of powders: dense, bulk, and Progressive. They differ in quickness, strength, and flexibility. We can make a powder quick or we can make it slow, by the amount used in connection with the shot charge, and we can secure plenty of drive from any powder, but flexibility might also be called "tolerance" or "range of tolerance." Tolerance means the variation in pressure under which the powder will burn and behave normally. Powders are behaving normally when pressures and velocities, whether high or low, are steady and uniform.

No nitro powder will burn except under resistance—weight of shot, powder, wads and crimp. Shot are the great resistant factor, which prevent us from varying the shot charge beyond certain fixed limits. The man who desires to load an abnormally heavy shot charge is getting on dangerous ground, and the man who desires to load an abnormally light shot charge is not going to get on dangerous ground or anywhere else. Only the ballistician with a pressure-gun and a chronograph can safely experiment with very heavy charges of powder and shot—and he is very easily scared.

The dense powders, of which we now have only Infallible, are probably the least tolerant. Infallible is a good powder, regular in drive and even in pressures, but loads ought not to vary greatly; perhaps not less than 24 grains should be loaded in a 12-bore gun, and not more than 26 grains or 27 at the outside. In the same way shot charges should be 1 1/8, 1 3/16 and 1 1/4—not more and not less. Enough powder might be put in a shell to get a good burning pressure with no more than an ounce of shot, but the pattern would fall off. With other and better powders for heavy loads of shot there is no need of loading more than an ounce and a quarter of shot, and this only with 24 grains of powder. The very best load of Infallible that I know of for duck-shooting is 26 grains and 1⅛ ounces of No. 6 shot. For quail-shooting 25 grains and 1⅛ ounces of 7½ shot works finely.

Bulk powders, as du Pont, for example, are much more flexible. Charges can be loaded as light as 2¾ drams and one ounce of shot, with the powder burning fairly well and the velocity sufficient to kill. At the peak 3½ drams may be used with an ounce and a quarter of shot, patterns being fair and pressures not dangerous. However, the greatest satisfaction is probably secured from medium loads, 3¼ drams and 1⅛ ounces of shot. In large pellets like 4's the shot charge can be increased to 1¼ ounces and both pattern and range thereby be obtained. I have secured fine results from du Pont in a load of 42 grains (3½ drams) and 1 5/16 ounces of shot, but that was only in a particular gun, and care had to be taken with the wadding and the crimp. Du Pont, Schultz, E. C. and Deadshot are no longer required for excessive loads, but should be confined to medium loads for ducks, and are still the best powders obtainable for upland and trap-shooting, with the possible exception of the 20-bore, which is often used for quail with an ounce of shot.

The Progressive powders, Herco and Oval, the only two I happen to know, are less flexible than bulk. Their minimum pressures must be much higher than du Pont, but their maximum pressures may also be run higher without becoming unsteady. So far as I know, Herco, a Hercules powder, has not been placed upon the market, and is not obtainable by the hand-loader. It works well in machine loads and doubtless will in hand-loads. Like black powder an overload will be demonstrated very promptly at the butt end of the gun. This feature should make it a pretty safe powder to hand-load. Oval powder has been quickened a trifle since it first appeared under the name. It is still too slow a powder for light loads, however, and should be confined to 1 ounce in 20-bore, 1 1/16 to 1 1/8 ounces in 16-bore, 1¼ to 1⅜ ounces in 12-bore, and 1½ to 1⅝ ounces in 10-bore.

Formerly I have loaded as high as 1¾ ounces of shot in 10-gauge, but the powder is too quick for that charge now. In 12-gauge the shooter will do well, unless he has unusual facilities for experimenting, to confine himself to just one shot charge, 1¼ ounces. In heavy double guns with 3-inch cases 1⅜ ounces is standard, but do not run powder charges too high. The correct powder charge should appear on the canister, and is lower than it used to be, perhaps no more than 36 grains, 12-gauge, or 36 to 38.

Progressive powders are semidense; that is, they take up less room in the shell than bulk and more room than dense. They are to be loaded by weight in grains and not by measurement in drams. This doesn't mean that every charge is to be weighed, but the machine or powder measure should be set by scale, after

which it will throw charges closely enough—just as accurately as cartridge-loading machines do, anyhow. Ten-bore shells run around 40 to 44 grains; sixteen, 30 to 32; 20-bore, 26 to 28. I dislike giving the number of grains to a load because powder lots differ and somebody might accept my figures and get an overload. Be governed by the powder canister, or else start in with the minimum load given. Velocities with Oval, and probably with Herco as well, run considerably higher—close to a hundred feet higher—than with other powders. Better duck loads in all bores can be made up with these powders than with bulk or dense. Shot should be chilled only, or both chilled and copper-plated.

Now, a man is not going to get anywhere in hand-loading without a certain number of tools. He can get along with a loading-block, a powder-and-shot measure, a rammer and a crimper, if he uses bulk powder. Dense and Progressive powders need a powder-measure, which can be set by scale to throw grains weight. However, what a man really needs is an Ideal shot-shell-loading machine, the only one to be had; best of my knowledge. This machine has the powder in one hopper; the shot in another. Raising a lever throws a powder charge; and lowering it causes the shot to follow, both running through the same tube to the case beneath. The case is held in a machined die, with brass fingers which prevent the frayed end of a shell from doubling down, while the die prevents it from expanding. The rammer is hollow, also acting as the tube which directs shot and powder into the case. Wads are rammed by foot power. One hand works the lever and the other places the wads while the foot is ramming them. Ordinary speed is a shell a minute, which might be speeded up to 100 an hour by a fast man. Powder charges are even to within less than half a grain, and No. 4 shot to within four pellets. Ramming is a matter of practice, and ramming force can be regulated at will from very light to a hundred pounds. Shot-shell dies are to be had for all bores from 28 to 10, and no changes are needed in the machine except to change the die and the rammer. Powder charges can be set for either drams or grains. Ordinarily I set my machine by scale and do not pay much attention to the figures on the drum, except to note the mark for a certain load, so that I can return to it without again weighing charges.

I use the Ideal Star crimper; but there are probably others as good. The Ideal works by hand, or it can be rigged up with a pedal so as to produce a very fast movement. It is a straight-line crimper, which is the kind to use, as otherwise the cartridge may be bent a trifle in crimping. The faster the movement of the crimper-head the smoother the crimp and the firmer, and extreme smoothness and great firmness add to the appearance of the finished cartridge more than anything else. One Star crimper takes all kinds or sizes of crimper-heads, 28 to 10.

Certain other tools are required if a man is to load his own ammunition economically. After a shell has been shot the end will be frayed more or less. An Ideal tool is made to cut the frayed end off to any desired length. Usually when reloading a case it is well to cut off about a sixteenth of an inch at the muzzle, whereupon the case will crimp very much the same as a new one. Additionally, however, a tool is made that irons out the end of the case, removing all traces of the old crimp. Of course the spent case must be decapped and reprimed, for which purpose a straight-line tool is made.

Without going to the expense of purchasing a machine good ammunition can be made up by procuring the dies alone, together with a rammer and a powder-and-shot dipper. The dies are strictly necessary if shells other than new ones are to be reloaded. The die is a snug fit and will not permit the cases to expand under wadding, and nothing short of the brass fingers which go with these dies will keep the mouth of the case from wrinkling. Cheaper crimpers than the Star will do fairly well.

I am mentioning the Ideal concern chiefly because this is the only firm that is now catering to the shot-shell loader. The old Bridgeport Gun & Implement Co. once did, but I believe this firm is out of existence. The "Ideal Handbook" will give more detailed instructions for loading than I have space for here, and a copy is to be had for the sum of 50 cents by writing the Ideal Manufacturing Co., Middlefield, Conn.

I have specified the tools required in reloading cases; that is, in loading them more than once, because unless this is done there is not much economy in hand-loading. The factories have put such a list price on empty cases, powder, shot, and wads that by the time a man has assembled all of these and has loaded his shell he finds that it has cost him within 50 cents a hundred of what the loaded cartridge would. In the old days discounts could be had from list prices, but I fail to see any announcement of discounts now. For all that, empty cases alone cost an average of $2 a hundred, and saving that $2 for an hour and a half's work is well worth while to most of us. Again, it is quite possible to load good cases two or three times—in fact, until they begin to burn out forward of the brass base. The only excuse for furnishing high brass bases is that such shells further reloading. I never throw away a Record, Leader or like case without a feeling of regret at the waste. So far as the machine load is concerned, such cases as Field, Nitro Club, Climax or a like shell in Peters work just as though brass came to the top. In reloading, however, the low base-cases burn out first. Our factories are making good cases, capable of being reloaded from two to four times, and every time a hundred shells are reloaded the saving is around a dollar and a half a hundred.

Aside from the economy of hand-loading, as noted, there is a deal of satisfaction in making one's own ammunition. For example, when I have made a very long kill with a cartridge of my own loading, I get more kick out of the result than I would if any factory had furnished the shell. This is just merely elementary human nature. We did it with our own little hatchet, and we made the hatchet, and we do not in the least mind telling the truth about it, or even a little more than that.

Now, we are coming to the gun crank, and we who use either the shotgun or the rifle are all more or less on the crank order. Perhaps we have a new gun, have tried it out with a variety of ammunition of different makes, and have apparently learned all about the power and peculiarities of the arm, so far as factory ammunition is concerned. Nevertheless, we are not quite content, but are bent on seeing if anything more can be done for that shotgun. Maybe it is a light quail-gun, and for our purpose it doesn't seem necessary to shoot an ounce and an eighth of small shot. We may have read of the Standard English "game load," 1 1/16 ounces of shot, and we want to try that load. It can not be had, so we load it. Maybe the gun is used for ducks, a heavier piece. To our mind, velocity is requisite in a duck load—velocity combined with pattern. We can get the velocity with 1⅛ ounces and the pattern with 1¼ ounces. Why not compromise with 1 3/16 ounces, getting both pattern and velocity. It is easy enough to try the scheme, if we are hand-loading. The hand-loader has every factor of good ammunition at his command, with no limitations except to refrain from dangerous experiments.

Then there is the matter of fitting a load into the gun. The factories can not do that for us. We can learn which factory load does the best in our gun, and that ends that. The gunmakers will tell us that they cut their tubes to the thousandth of an inch—bore, chamber and choke. Just so, it is probably true. Nevertheless and notwithstanding, I have never yet seen two factory barrels which shot precisely alike. On a test one barrel may shoot 6's best, the other 4's; or one barrel may do its best work with 1⅛ ounces, the other with more shot; or one barrel may do best when the shot are driven at a velocity of a thousand feet over the 40-yard range, the other with shot driven at no more than 950 feet. It is all a problem that only the experimental hand-loader can solve. I have a 10-bore gun one barrel of which performs well with a heavy, high-velocity load, the other with any kind of a load. This works out very well by using the heavy loads only; but if one barrel happened to perform well with a high-velocity load only, and the other with a low-velocity load only, I'd be in a fix. Matter of fact, such a thing has happened, and I have been obliged to have one barrel or the other rebored.

Every shotgun has some certain charge with which it will put up its very best performance. I have a Remington pump 12-bore gun which with a certain factory cartridge reached an average pattern of 84 per cent with a long string of shots; with another factory cartridge percentages dropped to 72 per cent. There it was a simple matter of finding the right factory shell, but I have a Super Fox that patterns from 79 to 82 per cent with factory shells, not better. With hand-loads it has averaged 87 per cent for a run of 10 shots. This kind of a gun must be fitted with hand-loads.

The process of fitting a hand-load is simple enough. Take a certain kind of powder and a certain size of shot as a basis. Generally

speaking, it is just as well to eliminate soft shot to start with. Select the powder in accordance with the use to be made of the developed cartridge—bulk powder for standard loads for upland shooting, Progressive for heavy loads in duck-shooting: Don't fool away time with a powder charge so light that you know you can not get normal velocities out of it, nor one so heavy that reason would tell you you can not get patterns from it. Before attempting to improve the performance of a shotgun be certain of having learned what its standard performance is with factory shells. It is possible that we may never be able to improve on a factory cartridge that happens to fit our gun. Much will be gained by finding that out, for we can probably duplicate that shell.

Say we have selected three drams of du Pont powder as a basis; try it with an ounce of shot, 1 1/16 ounces, 1⅛, 1 3/16, 1¼. Now increase the powder to 3⅛ drams and try those shot charges again, using the same size of shot, 7½c, or whatever it may have been. Run the powder charge up to 3½ drams, if desired. Shoot at least 5 shots to the test load, and 10 is better. Eventually you will know what the gun does with du Pont powder and No. 7½ shot, and the precise charge that does best. Then there are other bulk powders and other sizes of shot, and then there are the Progressive powers, to be tried out in duck-guns. Fitting out our duck-gun with Progressive powder is a highly entertaining performance, not to say a lasting performance. Getting the most efficient load will demand both time and study. Other things being equal, in duck loads give preference to the charge with the higher velocity. Other things will rarely be equal, however, for the highest velocity rarely throws the highest pattern, and a load that is intended for patterns and nothing else is not much of a duck load, either. For the uplands any charge of powder of not less than 3 drams will develop a killing velocity, and what we are looking for is pattern, either percentage or even spread.

WADDING

Twenty-five years ago when a great deal more hand-loading was done than there is now, much attention was paid to the wadding. Today the factories are very nearly confining their loads to good blackedge. The hand-loader might as well do the same thing—blackedge and cardboard. Ordinary loading is to put a cardboard next the powder because it contains no grease; then fill with blackedge, regular, ¼ inch and ⅜ inch, or all regular if you like, with a card under the shot and one next the crimp. The fine pinkedge, and white felt are rarely used, and never where economy is any object. White felt will improve patterns, but somebody has told us that the soft wadding does this at the expense of velocity. Corktex wads are very effective. Used between blackedge, Corktex is a good gas seal.

Regulate the ramming force by the powder and the load of shot. Putting down the wads with great pressure tends to quicken the powder, and if it is a slow powder, like Oval, that will be all right; but if it is a quick powder, with a heavy shot charge on top of it, the pattern will be hurt by too much force put on the wads. As a rule 40 pounds of even pressure is enough to put on the wads. Put the powder wads down one at a time. Some of the factories use wads one-half size large, and this works particularly well with Progressive powders—not necessary with bulk or dense unless the gun has been overbored.

The factories and about everybody else will advise filling the shell to within one-fourth inch of the top, leaving that space for the crimp. This is good general advice. However, crimping has an effect on breech-pressure and on patterns. A very heavy crimp is equivalent to adding one-sixteenth of an ounce to the shot charge. Therefore, when you know from the amount of powder and shot used that your pressures are going to run high, crimp lightly. When I am loading heavy and mean to get the utmost in patterns, crimp space is reduced to ⅛ inch, which is enough to hold the shot wad firmly in place, with new shells. The crimp of a case used the second time will not be so firm, and the ¼-inch crimp is right—shells expand and will hold more powder and shot on the second loading. I have frequently improved the shooting of factory shells by opening the crimp and recrimping more lightly, this when the charges are about the limit.

SHOT CONCENTRATORS AND OTHER DEVICES

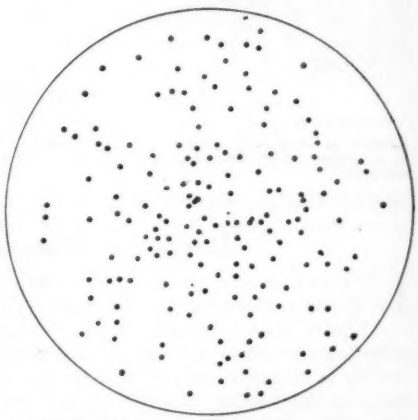
Occasionally we may desire to obtain extraordinary results in pattern and range. The simplest form of concentrator would be an ordinary tube, sealed at both ends, but it never works. Sometimes this form of concentrator drops the shot after a certain distance, and the next time it doesn't, the shot striking the ball instead. No form of after-muzzle concentrator has ever been reliable. The trouble lies in the tendency of shot charges to ball at the base. Loose shot charges tend to that, but not to the extent that they will not break up when past the muzzle; but if a tube confines them this ball may never break up.

The base of a shot charge embodies the entire trouble with shot patterns. If the base of the charge were uninjured by case-bore and powder pressure, we could get 100 per cent patterns without trouble. The shot charge has to sustain its own weight, added to the crimp. Weight comes on the foundation, of course, and not on the top.

All pellet injury takes place at the base of the load, and gradually decreases toward the top. Pellet injury reduces our pattern from 100 per cent to perhaps no more than 70 per cent, and at the same time causes shot-string. Chilled shot modifies pellet injury, and copper-plated shot should go further in the same direction.

The study of the shot-shell loader, whether in the factory or hand-loading, is to get away from pellet deformation., By way of doing this Sweeley made his shot-mould. This is a double wrapping of strong manila paper, fitted around a form and put together with mucilage or glue. Form a plug of wood, of a size at the top to fit the shell, at the base no more than a half or three-eighths of an inch in diameter. Cut the paper three-fourths of an inch wide and long enough to go around the wood twice. Paste down, slip off and let the glue dry. Put it into the shell, small base down, and load the shot into it and above it. Under pressure this base will break apart, but it will hold together long enough to get the shot out of the shell and past the cone, into the bore. Thereafter pressures are much reduced and the shot will no longer weld together. The paper now acts as a protection between pellets and bore, preventing abrasion. If the mold is working properly no lead will be found in the bore except a bit in the choke, and patterns will be improved about 5 per cent, with lessened stringing.

Shot-mould.—Cut Should Show Slightly More Taper



Shot-mould Load. 30-inch Circle at 40 Yards. No. 4 Shot, 1¼ oz. Pattern 164. Super-Fox Gun

A third scheme is to cut a small tube or a solid piece of pasteboard about one-fourth inch in diameter, preferably with a broader base. Glue this in the center of a blackedge wad. Now on top of this and resting against the top of the tube place a cardboard, upon which the shot are loaded as usual. The cardboard will bend downward around the tube under pressure, relieving the shot as before. Both of these last are forms of pneumatic loading in which air cushions the shot stress. Factories have not been able to use them successfully, but the hand-loader can.

Pneumatic Wad. Cardboard Goes on top of the Vertical Cylinder, Which is Hollow and is Compressed Under Pressure.

The AMERICAN RIFLEMAN

OFFICIAL PUBLICATION OF THE NATIONAL RIFLE ASSOCIATION, PUBLISHED MONTHLY AT 1108 WOODWARD BUILDING, WASHINGTON, D. C.

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Dangerous Theorizing

LUDICROUS as it must seem, it is nevertheless true that there are officers in the United States Army (you don't find them in the Marine Corps) who believe that a body of troops skilled in the refinements of rifle firing are not as effective in battle as the same number of rifles fired by men who are not acquainted with the refinements of sight-setting, wind-doping, etc. Then there is another group who, while admitting that trained riflemen are more efficient in battle than untrained shooters, nevertheless feel that the National Matches are a nuisance, serving principally to take away from their organizations officers and enlisted men who should be on duty building barracks and doing close-order drill. These two groups together constitute enough of a power in Army circles to cause constant agitation for the elimination of the National Matches.

As a result, either as a compromise to these officers or as a preliminary step to the total abolishment of the National Matches, the General Staff of the Army some time ago adopted the policy of National Matches on alternate years instead of every year. The result is only too well known to every individual and organization having anything to do with the training of Regulars, National Guardsmen, or civilians in the use of small arms.

The general attitude toward rifle-shooting during the past year, after it became definitely known that National Matches would be held in 1927, has been one of increased interest and enthusiasm, evidenced by the civilian riflemen purchasing more high-grade shooting equipment from the War Department than at any time in history. Officers of the National Guard in charge of rifle practice in their States tell us that the same situation prevails among the Guardsmen. That the National Matches can be held on alternate years or eliminated altogether is a beautiful theory—one which carries particular appeal at this time, when the principal policy of the administration is to save every possible penny; but the people charged with the all-important work of developing rifle shooters in this country know that it is a theory which does not work out in practice. Are President Coolidge, the Director of the Budget, and the Senate and House Military Affairs Committees to hear the opinions and to be guided by the ideas of the theorizers on the General Staff, or are they to receive the opinions and the advice of the practical men of the Regular Services, National Guard, Organized Reserve and civilian organizations relative to the benefits of Annual National Matches and the dangers and detriments of biannual National Matches, leading eventually to no National Matches at all?

The present plans of the theorists in the War Department provide for no National Matches in 1928. The National Rifle Association intends to "go to the mat" on this matter, and if necessary to carry the fight onto the floor of Congress. The Senators and Congressmen want to do what is right and what their constituents think is right. The majority of the Senators and Representatives are at home at the present time and will be home when the men now in attendance at the National Matches return from Camp Perry. If National Matches are to be held in 1928, it is vitally important that your Senators and Congressmen be advised as to the importance of Annual Matches. The time to advise them is while they are at home. Do not content yourself with personal letters and interviews, but see to it that every one in your community interested in the problem of national defense gets in touch with your Representatives in Congress. American Legion posts and similar veterans' organizations, sportsmen's associations of all characters, bankers and others are interested in this problem, and if properly approached will lend their assistance.

The practical people of any nation, properly organized, can always defeat the schemes of dangerous theorists. There is a lot of dangerous theorizing in regard to the National Matches. You *know* that the National Matches should be held annually. Do your bit—go out and work for them.

Abide By the Rules

BACK of every activity of any scope and magnitude lies some one strong central organization. The one great central organization back of all rifle shooting activities in America is the N. R. A. This is the organization which unites in one closely knit whole the hundreds of individual riflemen and rifle clubs scattered throughout the land. It is the organization which, in the united strength of its separate parts, presents a stalwart and unbroken front to every effort directed toward disarming the law-abiding citizens of the country. It is the organization which is forcing upon the apathetic public a recognition of the fact that, as it was the rifle that won America for Americans, so it is the rifle that will safeguard America for those same Americans; and that rifle-shooting is, moreover, one of the finest he-man sports any country has ever known.

It is the N. R. A. that helps discouraged shooters and discouraged clubs to come back, holding out a helping hand in time of need. Through the N. R. A. arms, ammunition and supplies can be purchased at great saving from the Government. Through the N. R. A. the activities of different clubs and individuals, scattered to the four corners of the land, are co-ordinated. Through the N. R. A. individual shooters, as well as clubs, are able, on their own ranges, to enter into competition with other shooters and other clubs hundreds of miles away.

To operate in this way, on a nation-wide scale, it is necessary that there be established definite rules for the guidance of all concerned, and that in all cases these be rigidly adhered to. The N. R. A. has such rules, which are based upon extensive knowledge and experience. It is quite conceivable that occasions might sometimes arise where in some individual case a departure from the established N. R. A. rules might possibly appear to offer some slight advantage. But it should always be borne in mind that definite, established rules are necessary in any field of activity; and that where these are violated or disregarded only disorder can result. And without order no lasting or worth-while results can be accomplished. If at any time the established rules should appear to be inadequate or out of date they can always be changed officially and in an orderly manner. It should be remembered that the established N. R. A. rules have for their sole object the best interests of the greatest number of shooters; and individuals and clubs should be broad-minded enough to set aside their own particular ideas and preferences, and in all official competitions abide by the rules which have been established by the parent organization for the greatest good of all concerned.

Bears Before Breakfast

(Continued from Page 9)

the top of a hill a couple of hundred yards east of camp.

Looking southwardly over the top of the timber around camp to a level mesa, I saw about a dozen head of cattle perhaps one-third of a mile distant, with their heads all up and looking one way. When it got a little lighter I noticed a bull some distance ahead of them which seemed to be very angry. He would paw the ground for awhile, then hook chunks of dirt and bunch grass and dirt and throw it back over his shoulder. Then I discovered that 50 yards ahead of him was another animal standing still, which I first took to be another bull, but as the light grew stronger I could see that it was a large bear. The bull did not offer to charge but stood his ground and challenged. The bear advanced very slowly, made a few steps, then stood still awhile.

By moistening my finger and holding it up in the air I determined that what little breeze was moving came from the north. There was a heavy growth of timber a hundred yards behind the grizzly and a lone fir tree perhaps seven feet high stood out alone on a ridge about a hundred yards south of the expected battleground. I decided that by circling to the south I could make the lone tree, and from there see the fight and have a good shot at the bear.

I left my horse at the foot of the ridge and hastened up, and saw that the combatants were now only about ten paces apart. The bull, whose anger was still high, was in the same place, but the grizzly was slowly drawing nearer and intently watching every movement that the bull made. He was the largest bear I had ever seen outside of Golden Gate Park in San Francisco. In fact, I thought, "should I not stop him with my .30-30 Winchester I wonder if there is a tree over there that I could get into," and, glancing toward the first tree to my left, I was surprised to see a large cinnamon bear lying down like a dog, head up. He was about 40 feet distant; and 10 feet past him on a little higher ground stood a second cinnamon, while a third one stood a few feet farther on. All were very interested in the coming fight, as were the cows and yearlings back behind the bull.

These brown bears had been following the grizzly around, the way a pack of coyotes sometimes follow a timber-wolf, to eat after he satisfies his hunger, but very careful to keep out of any danger to themselves. On seeing them my uneasiness left me in a flash, and I thought: "Well, well! Here's the bunch that made the night hideous for me as I laid with my leg broken on Iron Creek, and here is where I get even."

The first shot broke the neck of the light brown bear lying down; his head dropped on his paws and he never kicked. The second caught the next one behind the right foreleg; he rolled down close to the first and never tried to get up. The third was running uphill for the timber. The shot broke his backbone, so he slowly dragged himself under cover and I knew he was safe.

Then I saw the big grizzly running back and forth in a quarter circle trying to catch my wind, as he could not see me, and snorting every jump. I looked in my gun and saw only one cartridge, so did not dare to chance a running shot; and, expecting him to charge every minute, decided to try for his shoulder if his head were too low for the white spot. When he swung around to the trail of blood the wounded cinnamon left he plunged into the brush after him. I waited a few minutes for him to show up, then carefully followed into the timber and found the crippled bear chewing at a small quaking aspen tree. I circled around for awhile; and, seeing or hearing nothing of the grizzly, returned and put the wounded bear out of his misery, and returned to camp.

Manufacture and Testing of High-Power Rifles

(Continued from Page 15)

protected against moisture for several years storage if necessary. They are then sent to the shipping department, where every rifle is packed in a special individual carton. This individual packing insures delivery of the arm to the customer without unnecessary handling, and danger of breakage in transit. As we stood on the shipping-platform reading the destination of cases of rifles that were going from our near-by Adirondacks to far off India and Australia, my mathematical friend, the sergeant, was still trying to figure out how many different operations he had seen during the day that were necessary to produce the finished Model 99 rifle. His guess was still so far short that I had to tell him he had looked at some 800 classified operations during the day, at which he remarked that no wonder he was tired.

My companion came out with a new feeling of security and confidence in the average rifle. He had taken it for granted that a rifle was just made and had heard stories of rifles that shot loose and had occasionally had experience with defective arms. He, like the average layman, had no idea of the skill, science, and relentless accuracy involved in the turning out of Hi-power rifles. Certainly you may be sure he will have a more friendly attitude toward his shooting-piece when he gets home than he has ever had before.

On our way back to the factory office a stop was made in that mysterious part of every firearms plant known as the experimental department. A large "No Admittance" sign on the door indicates the mysterious goings on that are taking place in the never ending experiments in the design of firearms and the development of Hi-power rifle cartridges. My Army friend was shown the fascinating experiment of taking Hi-power rifle-cartridge ballistics with a chromograph, and told of the many famous productions that had emerged from this experimental room. The development of those famous rifle-cartridges, the .22 Savage Hi-power and 250/3000 Savage, were the pioneers in Hi-speed cartridges, and is a story in itself. It is enough to say that the making of a Hi-power rifle is only part of a manufacturer's activities. He must watch continually the performance of the cartridge chambered for his rifle and strive for the highest possible results, for only can the full capacities of the fine workmanship of a rifle barrel be brought out by using it in perfectly balanced ballistics in its cartridge.

MANY LONG-TIME SAVAGE WORKERS

In discussing the varied human elements that enter into all manufacturing plants, my investigating friend, who has visited many modern manufacturing plants, found an interesting phase in this work when he was told that many of the men operating on the most intricate pieces of firearms production have been Savage emyloyees for twenty or more years. These obscure men whom the public never meets are the real operators of the business. High executive officers come and go, and their varied interests lead them away from the time-honored pride of a personally finished piece of work that was characteristic of our early American manufacturers. This pride of workmanship, however, still exists among the old employees in many of the Eastern manufacturing plants, and it is to the credit of these skilled workmen that the high quality of the products is carried on to continual betterment based on years of experience.

A Sermon On the Mount

(Continued from Page 8)

that the service-rifle barrel is a very steady performer, while the rest employed (the A. L. Woodward cradle) is without a doubt the finest, most simple and scientifically correct ever designed for this type of rifle:

RANGE 600 YARDS

(M1 ammunition used)

1927 *N. M. rifle*		*Mann type barrel*	
Two rifles used		*Three Mann bbls. used*	
M. R.	*Group dia.*	*M. R.*	*Group dia.*
3.95 inches	11½ inches	3.77 inches	10⅛ inches
3.58 inches	9¾ inches	3.66 inches	10 inches

The above are the means of forty 10-shot groups using, of course, the Mann V-block in each instance. They clearly indicate that M1 ammunition is very excellent, two lots of ammunition made many days apart being tested.

Again, an impromptu test was run using an N. M. rifle selected at random from ten just received from Springfield Armory, of the vintage of 1926-1827. In this instance N. M. ammunition of the year 1925 was used, the last of this remarkable ammunition now being on its way to Perry.

RANGE 600 YARDS

Group No.	*M. R.*	*Group diameter*
1	1.78 inches	6 inches
2	2.66 inches	8 inches
3	2.67 inches	8¼ inches
4	2.87 inches	9 inches
5	1.96 inches	6¾ inches

This sort of work indicates just one thing, and that is that poor work on the part of the competitor, provided he has not abused his piece, will be due to buck fever or a bad stomach. The rifles and ammunition are just about right.

What COLT has done

The ability to excel in any sport is as dependent upon the perfection of the equipment as its dextrous use . . .

ACCURACY, dependability, safety—these are the attributes which have endeared Colt's fire arms to generations of sportsmen.

Because of these features of superiority, Colt's have been selected by the most consistently expert shooters. And because of these superiorities of the Colt, these men have become and remained champions.

It was a Colt that made the first "possible" or full score of 100 points at 20 yards recorded under official match conditions.

Colt supremacy has been demonstrated again and again by the winning of national and state pistol matches and establishing new high scores. These records have been possible because the Colt Company has never made but one grade of fire arms and that the highest possible quality in design, material and workmanship.

Every detail which goes to make up a Colt Revolver or Automatic Pistol is proven for strength, adaptability, proper adjustment and operation before the arm is passed.

Colt gives to the shooter that confidence which only absolute dependability can inspire.

Colt "Camp Perry" Model Single Shot Pistol

Here is Colt's latest achievement. A .22 Single Shot target pistol, having the same grip, balance, action and general "feel" as the Colt Officer's Model Target Revolver, which it is cleverly made to resemble.

Colt Officer's Model Target Revolver

The most popular .38-caliber target revolver ever produced. Made of the finest selected materials; every part tested, inspected and assembled by skilled workmen and each arm shot for target.

Colt Army Special Revolver

The ideal all-around revolver of the "military" type. Popular with military and police experts. Repeatedly winner of the National Revolver and Police Matches and holder of Camp Perry Range Record (1911).

COLT

COLT'S PATENT FIRE ARMS MFG. CO.

for Men who Shoot

Colt's target arms are to the shooter what an accurately balanced set of clubs are to the expert golfer .....

THERE is no more manly or satisfactory accomplishment than good marksmanship, and none that depends more surely upon the accuracy and balance of the equipment.

Place a questionable tool in the hands of a Hagen, a Ruth or a Tilden and his scoring is certain to suffer. Each sports expert has his favorite clubs, bats or racquets as the case may be.

They must be fashioned to his hand—balanced to his liking—designed and manufactured with professional skill.

This is doubly true with shooters. The arm must be smooth-working as well as accurate. And it is in just these points that Colt's range arms particularly excel.

The shooter who has a selection of Colt target models is justly proud of them—of their perfect design and finish, smoothly operating mechanism and businesslike appearance and because they hit where they're held.

Target shooting is a most thrilling and competitive sport and one in which it is quite easy to become an adept.

Let us send you our handbook for shooters—interesting to both expert and novice—and our Fire Arms Catalog No. Write for them. There's no charge.

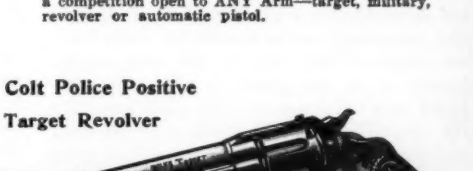
Colt Automatic Pistol

Cal. .45—Government Model

The Arm with which every military man is familiar, BUT how many shooters know its TARGET capabilities, proven in 1919 when with it was made the World's Record (294 x 300) in a competition open to ANY Arm—target, military, revolver or automatic pistol.

Colt Police Positive

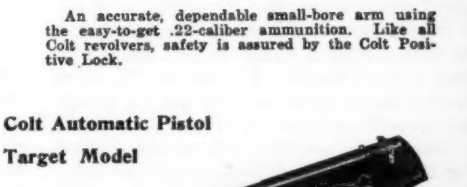
Target Revolver



An accurate, dependable small-bore arm using the easy-to-get .22-caliber ammunition. Like all Colt revolvers, safety is assured by the Colt Positive Lock.

Colt Automatic Pistol

Target Model



Also called "the Woodsman." Shoots .22-Long Rifle rim fire cartridges or the new 200-yard ammunition. An exceptionally accurate, well-balanced arm. Equipped with safety lock. Magazine capacity, 10 shots.

COLT

SMALL ARMS DIVISION HARTFORD, CONNECTICUT

Tuning-up Side Arms

(Continued from Page 16)

is what usually happens: the shooter will show the pistol to his friends, and either they or himself (of course first looking twice to see that the pistol is not loaded) will commence to cock and snap the pistol, sometimes placing the thumb behind the hammer-spur to force it forward, and continue to snap until the hammer will not stand the jar of the slide closing.

The correct way to try a newly corrected trigger pull is on the firing-line in use. In this way the edge of the sear will fall into the bottom of the hammer notch and will make its own seat. The sear must fall into a notch, and not on the middle of a smooth surface, or a creep will be the result. The weight of the pull must be the force required to pull the sear out of the notch, and the sear must come clean without sliding on the top of the notch. Therefore, when the hammer is drawn back slowly without the forward action and jar of the slide, the sear is not properly seating itself in the notch. After a little use on the firing-line the arm may be used in dry shooting with little if any damage to the pull. I have three .45 Colt Automatics which I corrected to a 4¼-pound pull in 1919 at Caldwell, N. J., and they are still over 4 pounds and have never been changed.

Many of the arms which are brought to me at Camp Perry are arms which were made for the late war, and of course target-arms were not as necessary then as an arm built for dependability and speed of fire. Barrels that have long been in use, and in some cases not properly taken care of and were service barrels in the first place, are not to be compared with a fine match barrel made expressly for target-shooting. The slide may be loose and the arm badly battered, but with a good barrel it will still deliver the goods. The heart of the .45 Automatic is the barrel. I recall an instance two years ago when one of the men brought an automatic to me and said that all the sharks had worked on it and they could not make it shoot, or group the shots. I told this man that I thought I could correct his trouble without seeing the gun, and handed him a match-barrel. A little later he came back with the report that the arm was grouping properly and gave no further trouble.

Many little troubles, such as sights jumping out, are eliminated in the improved arms, for with the new square sight-stem the sights can hardly be pulled out with a vise.

We have not as yet mentioned the revolver and single-shot pistol, and on this subject there is not so much to talk about; first, because these guns have not led the uncertain and careless life of the war-time automatic; and, secondly, because they are built for accuracy as well as durability. Shooting lead bullets is not as wearing on the barrel as shooting the metal-cased bullets; and it is not an uncommon sight to see a shooter on the firing-line with his twenty- or twenty-five-year-old Colts punching little holes in the 10 with the best of them. It is true that the size or shape of the sights may require some changes to suit the requirements and ideas of the different shooters, as in the case of the automatic. All troubles due to changes in light, canting the arm, seeing too much of the front sight, holding the front sight below the level of the rear notch, etc., are encountered in the revolvers as well as in the .45 Colt Automatic. A lighter pull may be required, and if this is the case it is far better to replace the spring with a lighter one than to try to change the hammer notch or trigger. These parts are hand-fitted by Colt experts, and should not be disturbed. As before stated the lighter spring will change the pull to the desired weight. The reason for the heavier spring is that the majority of the arms used in the matches at Camp Perry are also used by police departments throughout the world, and must be capable of shooting double action without a misfire. In rough-and-tumble police work a misfire may mean the officer's life; and every revolver which we test in shooting-galleries and which has fixed sights must not only pass the accuracy test, but also must shoot double action without a misfire.

On target model revolvers, the lighter spring is used, as these arms are in nearly all cases shot single-action, and in this way you will obtain the best results in your matches.

In rapid-fire or 10-second work I have obtained the best results by starting the men in at 15 seconds and gradually working down to 10 seconds, first obtaining the desired accuracy and then speeding up the time. The old joke about police officers not being able to shoot is quickly forgotten at Camp Perry. It is a pleasure to stand back of the firing-line and watch the police go through their daily dozen, not only making high scores in their own matches, but heading the list in many of the others. The number of police teams have increased from one team, a few years ago, to sixteen teams in 1924; and this year I hope to see at least twice that number present. Hundreds of police departments are taking up shooting, and this is their life insurance, as well as added protection for every citizen.

My worries on the firing-line are not the number of arms that are brought to me, but the number of unsuccessful operations performed upon the patient by unlicensed gun surgeons (I think I put that over without hurting anybody's feelings). I have encountered so many experimental models and improvements which neither Col. John Browning nor the Colt company have ever thought of trying that I am wondering what this age of science will bring forth this year.

Remember that the most essential thing on the firing-line is *safety*, not only for yourself but for the other shooters as well. Nearly every year someone on the line has handed me a loaded revolver or pistol for adjustment. This is very dangerous. A loaded pistol in the hands of a man who does not know that it is loaded, and who goes walking past the other men, possibly stopping to explain to a friend his trouble, should, whether he has had an accident or not, take an hour off and think out a safe and sane method for handling firearms.

We are indeed fortunate who can make this trip to the wonderful city of tents, where not only the shooter, but his family may spend a vacation that will long be remembered. I wonder if we who reach the camp when everything is ready realize what an undertaking this is for the Colonel and his army of assistants. Everything for the shooters' comfort is provided, even to one of the largest fresh-water swimming pools in the world.

Our One Best Rifle and Its Proper Stocking

(Continued from Page 11)

and most of the other large English cities, the gunmaker will be found to be equipped with "try" guns, measuring jigs, etc.; and a shooter can therefore be fitted with a gun much as he would be for a suit of clothes. This applies for the most part to shotguns and double rifles. Here, we perhaps reside in Texas and our gunmaker in New York; and we must do the best we can by correspondence, the gunmaker having little idea just what his client looks like—whether he is built like a battleship or a racehorse. However, largely through the efforts of the various arms editors, the best and most sensibly stocked rifles are to be found in this country today. The fuller forearm, the better grip and the thicker comb are all productions of the minds of our foremost rifle authorities, and the small concerns have for the most part adopted their suggestions, with the result that today the shooter need have no fears about getting a proper fit in his rifle if he will only sit down and write the maker intelligently, giving him all the assistance that he can.

The small maker caters to the shooter who knows what he wants, and he usually takes pride in turning out just as fine a weapon as he knows how to produce. There is no reason to go outside of this U. S. A. today for fine rifles. For example, a Mauser action alone, without barrel or stock, will cost as much as a fine, complete Government Sporter will cost through the N. R. A.; and as far as workmanship or accuracy goes, there is no comparison. The Springfield action and barrel are about the last word. To the man that wants the best that it is possible to produce, and at a very reasonable price at that, my advice is, buy the Springfield Sporter through the N. R. A. To the man who feels that he can have a hand-fitted and balanced rifle made up I would say write to any of the small makers, giving them about your general make-up, and I feel sure that you will have no trouble at all about "fit."

The writer can not help but wonder just what kind of a war it would be, and just what the effect would be, were all the civilian members of the N. R. A. rounded up into one unit and told that they could use their sporters. I feel that if ever infantry got a chance that bunch of N. R. A. members would hang up some real scores. I am not quite sure that Uncle Sam knows, or appreciates, the formidable civilian corps of riflemen he is building up or realizes the account they will give of themselves in the next fracas. I share the view of Colonel Sheldon and Captain Curtis that the Sporting Springfield and the lowly Woodchuck helped to win the last war. And this is worth thinking over.

Conducted by C. B. Lister

Selling Rifle Shooting To An Entire City

THE novelty of such an organization as the Lycoming Rifle Association, of Williamsport, Pa., seems to have attracted the attention of the rifle cranks of more than one section of the country because of the fact that it has interested so many men and because of its being composed entirely of the employees of various industries, business houses and banks and more than one inquiry has been made, "How was it done?"

Originally the idea was conceived by the officers of the two National Guard organizations of Williamsport, Pa., in the hope and expectation that it would lead to getting the men interested in their organization and would result in securing desirable recruits.

An effort was first made to interest one or more men in several of the manufacturing plants, so that they would work up a sentiment among their fellow workmen. The National Guard units were the possessors of two of the new .22-caliber Springfields, and they offered the use of these and of their indoor range, which accommodated two targets, free of charge to the organization. They also offered to furnish free the ammunition required but when the association so greatly outgrew the original idea this was found to be too much of a drain and the association after a time furnished its own ammunition.

It was hoped at first to secure ten teams and plans were made upon that basis. When the announcement was made in the newspapers of what was under way applications for membership came faster than they could be accommodated. Eventually the association opened the season with a membership of 24 teams.

The first step in organization was to arrange for a dinner, which was served by the women of one of the city churches at a very nominal cost, at which brief addresses were given by men qualified to speak and to explain matters. This was attended by more than 100 prospective shooters, and at this time an organization was effected. In order to permit each team to shoot one score each week it was necessary to enlarge the range, and this was done by members of the association, the city engineer's men making the plans. When the shooting was fairly under way the range, which is located in the basement of the State Armory, had been expanded until it accommodated ten targets.

Starting with the two rifles owned by the National Guard it was not many weeks before the men began to buy their own rifles, and before the indoor season closed more than two-thirds of the men were shooting their own rifles and individuals who had never shot before were picking up in their work and making good scores. By the end of the season more men were making an average of over 90 than those making less; and most of these men were strictly and absolutely tyros. Not only had the men become rifle cranks, but each team had one or more spotting scopes in its ranks and several of the big manufacturing plants had taken sufficient interest in their men and the shooting they were doing to install ranges at the plants where they could get practice at such times as met their convenience.

The plan adopted was to allow each team to shoot a maximum of ten men, the high five scores to be counted in the match. Some of the teams found it difficult to have five men at all times, while two of the big manufacturing plants had two teams in the field and no trouble keeping them filled. One of the sufferers in this respect was the City Hall team, which was composed of men employed at the City Hall and which held fifth place until almost the end of the season, when the absence of one man left them with a four-man team and killed their interest.

The teams in the race all finished the season. Not one dropped out until the last score was fired. They represented the large manufacturing plants, smaller plants, big department stores, a bank, the City Hall and the National Guard.

When the indoor season closed an outdoor range was secured, and the association is now conducting a match on longer ranges than were possible in the armory. Only six teams dropped out at the close of the first season and eighteen teams are now in the contest.

The association has no fees or dues. It has a board of governors who pass upon all expenditures, and when money is needed an assessment is made to cover the charge. Aside from ammunition charges the association requirements are small.

THIRTY-FOURTH ANNUAL INTERSTATE TOURNAMENT TO BE HELD AT SEA GIRT

THE Thirty-fourth Annual Interstate Tournament, sanctioned by the National Rifle Association, will be held at the historic range, Sea Girt, N. J., September 3 to 11, 1927. There will be included the usual Sea Girt matches—individual, squadded and team—such as the time-honored Dryden Match, at 200, 500 and 1,000 yards, in which $250 in cash prizes are given; the Sadler Match, at 800, 900 and 1,000 yards; the Sea Girt National Individual and Sea Girt National Team, under same conditions as the National Matches at Camp Perry.

September 3, 4, and 5 will be largely devoted to matches of the New Jersey National Guard, individual, company and regimental teams, interspersed by some of the regular matches and a liberal small-bore program, which many of the contestants in the Sixth Annual Tournament in July will no doubt attend.

The shotgun range will be open during the Tournament; a new innovation.

Then the old long-range matches at 1,100 yards (the Libbey), and 1,200 yards (the Spencer), will be fired.

Those who can not attend the matches at Camp Perry and desire a shooting outing over Labor Day will find that the Sea Girt authorities will extend them a cordial welcome.

The New Jersey State Rifle Association and the State of New Jersey feel that they should keep up the continuity of their annual competition, this being the thirty-fourth year that Sea Girt has invited the world of shooters to make the range their Mecca.

The Sea Girt authorities feel that this is a patriotic duty even though it may not be a financial success. "Keeping the game alive," as Sea Girt has done in the darkest days of rifle-shooting, is the slogan of our New Jersey riflemen friends.

NEW STATE SECRETARY FOR WASHINGTON

MAJ. I. W. KENNEY, Ordnance Department, Washington National Guard, has been appointed N. R. A. State Secretary for the State of Washington. Major Kenney was elected secretary of the Washington State Rifle Association in May and has also been assigned by the Adjutant General as the officer in charge of small-arms activities for the National Guard. With these three jobs circularized in his hands, Major Kenney is in an advantageous position to do a great real of constructive work for the shooting game in Washington. Rifle clubs or individuals may get in touch with the new State secretary by addressing him at Camp Lewis, Wash.

ENGINEERS ARE GOOD SHOTS

COMPANY C, 13th Engineers, Fort Humphreys, Va., ended the range season with 100 per cent qualification in rifle, pistol and automatic rifle. High rifle score: Sergt. Julian O. Manuel, 334; high pistol score: 1st Lieut. Patrick H. Tansey, 93 per cent. High automatic rifle score: Pvt. (first class) Karl G. Johansson, 583. This company also won the Regimental Marksmanship Cup for highest average score per man.

LONG BEACH STAGES SPLENDID SHOOT AS NEW RANGE IS OPENED

THE Long Beach Rifle and Revolver Club held their Third Annual Western States Small-Bore Shoot on the 2nd, 3rd and 4th of July. A good crowd was in attendance, but not as large as expected. The Long Beach Club had for the last three months been preparing for this annual event, $800 having been spent on the range in new butts and firing-point. The club now has the only complete small-bore range in southern California. The firing-point is shaded; and back of this are shade trees for the comfort of those not firing. Sixteen may fire at 50 yards, sixteen at 100 yards, six at 150 yards, six at 175 yards and six at 200 yards, all at the same time, from a common firing-point. All 50 shooters are shaded by a palm-leaf-covered awning on a raised firing-point.

The revolver range has five double targets at 25 yards, and also has a firing-point shaded by a palm-leaf shelter. The club expects to put in five more targets at 50 yards.

The cups and medals for this shoot were purchased by the members of the club, in addition to which Mr. Ross, of Santa Barbara, donated a cup for the 100-yard match, as had carried off the honors at this range last year.

The usual fine California weather favored the matches.

Saturday, July 2, opened with the 50-yard reentry, 100-yard reentry and long-range stage of the Underwood Match. Scores of the long-range stage of the Underwood Match at 150, 175 and 200 yards follow: Du Nah, 471; Wright, 469; Ross, 467; Broadhead, 464; Mrs. Dezert, 463; Seyfriedt, 459.

The 50- and 100-yard match for tyros was also shot on this date—McClure, 194; Joy, 193; Bowman, 192; Moore, 191; Weir, 190; Currier, 187.

Sunday, July 3, opened with the Palma Match at 150, 175 and 200 yards on the C 5 target. The conditions were not ideal for long-range scores as there was a fine fish-tail wind which tossed the 40-grain pellet up and down and in and out. Currier was first with 222; Goldsbourgh, 221; Weir, 220; McClure, 220; Evans, 218; Henderson 218. Last year this match was won with 223, and 222 took fifth place.

Next came the Dewar Match at 50 and 100 yards, iron sights. Du Nah first, 388; Weir, 384; McClure, 383; Currier, 382, Bowman, 381; Rains, 381

Monday, July 4, opened with the Team Match at 150, 175 and 200 yards on the ring target, 2 sighters and 10 for record, with four-man teams. Five teams entered, but one was disqualified. The Los Angeles Club team, consisting of Currier, Bowman, Broadhead and Payne, were first with 1,058. Rodeo Club was second, with Mrs. Dezert, Wizeman, Dezert and Du Nah shooting a 1,043. Long Beach No. 1, third, with Rains, Johnson, Hall and Moore shooting a 1,039. Long Beach, No. 2, with Mrs. Hall, Evans, Seyfriedt and Marleau scoring 1,025, fourth. And Ontario came next, with 1,024, Nelson, Joy, Eichorn and Reihsen composing the team. This match was shot under difficult conditions, with a bad mirage and fish-tail wind that made it hard to stay in the 10 ring.

Last of the matches was the 200-yard match on the ring-target, this match being fired at the same time that the 50- and 100-yard stages of the Underwood match were being shot. At 200 yards Goldsbourgh was first, with 92; Evans, 92; Nelson, 92; Broadhead, 91; Bowman, 90; and Mr. Dezert, 88.

The Pistol and Revolver matches were shot on Sunday, July 3, and Monday, July 4. The 22-Caliber Slow-fire Match was won by F. C. Payne of Los Angeles, with 86; L. Roberts of Long Beach, made 85; G. M. Upshaw, 84. Free Pistol was won by F. C. Mattorn, Anaheim, score 84, L. Roberts, of Long Beach making 84;Weiman, Santa Monica, 83. Big Bore Match, won by L. E. Lyon, Anaheim, score 100; D. D. Taylor, Pasadena, 100; C. I. Richardson 99. Rapid-fire Match was won by Stone, Los Angeles, 92; L. E. Lyon, Anaheim, 90; Ward, Los Angeles, 90. The Team Match was won by Los Angeles Detective team.

The matches went off well, with a volunteer detail from Fort McArthur, Lawrence, and six non-coms. served as range officers; A. Q. Johnson as executive officer; C. Underwood as treasurer; C. I. Richardson being in charge of the pistol range, with Lane as assistant.

The club is already making arrangements for a bigger meet next year and expects to have more matches, more prizes and a larger attendance. This year the club, against their judgment, postponed the matches to the dates in July on account of the tryouts for the National Team matches. A holiday date is not a good one unless the wife shoots, as some of the absent shooting cranks found out when they said "I am going to Long Beach the Fourth to shoot." About 75 attended the matches

DAVENPORT AWAITS BIG SCHUETZEN MEET

THE regular monthly shoots of the Davenport (Iowa) Shooting Association are resulting in the turning in of some splendid offhand scores. All shooting is of the Schuetzen offhand style, any rifle and any equipment being allowed. These monthly shoots staged by the Davenport Association, it is explained, are really preliminary events leading up to the coming National Tournament of the Central Sharpshooters' Union, because a big per cent of the Schuetzen riflemen of this country will be found in and around this Iowa city. The turnouts on the part of local riflemen are always good.

The addition of $3,500 in prize money which is being offered in the tournament to be shot at Davenport in September, is creating added interest in this event, and it is expected that approximately 75 full-fledged offhand riflemen will attend. Shooters interested in offhand shooting or Schuetzen work with the rifle, and desiring information concerning the Central Sharpshooters' meet, should communicate with Mr. Emil Berg, 1801 Pershing Avenue, Davenport, Iowa. Mr. Berg will gladly furnish programs to interested parties upon request.

WRIGHT WINS ROBERTS ISLAND SHOOT

HENRY C. WRIGHT, of Fresno, won the Annual Shoot at the Roberts Island Rifle Club on June 26. His scores were 45, 45, and 44 at 200 yards. Perfect scores at that range would have been 50, 50, and 50. E. N. Moor, Jr., of San Francisco, took second place with 45, 44, and 44. The other three high scores of the day were made by Waldo Haack, of Stockton, 45, 44, and 43; Maurice Kaiser, of Sacramento, 45, 43, and 43; and C. G. Barthold, of Stockton, 43, 42, and 41.

The wind was quite severe on the range throughout the day and furnished alibis for the small-bore shooters. All of the prizes were won by those who shot the U. S. Army Springfields.

This reentry match is the last event to be staged on the Roberts Island Range this season. The Club grounds will be closed until September. The next big event will be the annual Turkey Shoot on the Sunday before Thanksgiving.

Marksmen from many communities in central and northern California motored to Stockton for this shoot. Luncheon was served in the clubhouse for the competitors and spectators and many remained on the Ronkendorf ranch from 9 o'clock in the morning until 7 o'clock in the evening.

The shooters from Stockton included Judge C. P. Rendon, Henry P. Ronkendorf, Archie Toal, Henry C. Lockey, George Titherington, Walter Gyr, Walter Hubbard, Creed Hansford, George Ohm, George Warman and Gerald B. Wallace.

Those from out of town were William Cillier, of Lodi; Roy Coursey, of Antioch; C. K. Curtwright, of Sacramento; John Rahm, of Oakley; George McCormick, of Sacramento; George O. Snow, of Sacramento; L. J. Vanderbundt, of Antioch; S. C. Williams, of Oakland; J. S. Sadler, of Layton; J. H. Zahn, of Antioch; C. R. Coursey, of Antioch; Compton Gault, of Hercules; and Compton Gault, Jr., of Hercules.

NUTMEG LEAGUE HOLDS ANNUAL FIELD DAY

DR. C. J. MOORE, Secretary of the Nutmeg Rifle League, reports that that organization held the most successful field day of its six years' history on the range of the Bristol Rifle Club, at Lake Compounce, on June 11, when well over a hundred shooters and their friends attended. Four ranges were available for the shooting and each was placed in charge of one club or group of clubs. The Pistol Range was run by the Bristol men, the 50-yard Small-Bore Range by Meriden, the 75-yard High-Power Range by New Britain, and the traps by Middlefield, Cromwell and Middle Haddam. All events were reentry, which greatly added to the interest.

On the pistol range the Bristol shooters cleaned up pretty well, C. H. Mason, of Bristol, being high with 177 x 200. J. P. Leonard, of Avon, was runner-up with 176, and two more Bristol men, Holden and Moore, took third and fourth places, respectively.

About 35 men and women took part in the pistol matches.

On the 50-yard range, F. O. Kuhn, of Stratford, and C. S. Neary, of Birdgeport, topped the list with possible scores of 200.

About 30 individuals recorded scores with the small bore.

At 75 yards, shooting offhand, Robert Nisbet, of South Kent, topped the list with an 89 x 100. Elihu Lyman, of Middlefield, was runner-up with 86, and E. Naramore, of Bridgeport, third, with 85. The scores of approximately 35 individuals were registered with high-powered rifles.

C. A. Pickering, of Middletown, and Elihu Lyman, of Middlefield, tied with 24 x 25 on the trap range, leading a list of about 30 competitors.

The prizes ranged from silver cups down through fishing-rods, tackle-boxes, silver cigar-humidors, desk sets, mantel-clocks, etc., to pearl-handled penknives and duffle-bags.

COMPANY F, FLORIDA NATIONAL GUARD, NOW HOLDS GRAHAM CUP

THE third five-man gallery match for the Graham Cup and the 50-foot team championship of the Duval County Armory were fired at Jacksonville on the evening of June 17. Three teams, representing Jacksonville Rifle Club, Palmetto Rifle Club and the winners, Company F, Florida National Guard, were entered. Iron sights only were specified and the course of fire called for firing in each of the four positions. The match, as usual, was closely contested, the two leading teams being tied as they went into the last stage, the offhand position. It was at this stage—the standing string—that the military boys forged ahead to win by the narrow margin of four points. The teams finished in the following order: Company F, Florida National Guard, 479; Jacksonville Rifle Club, 475; and Palmetto, 464.

MARTIN COPS LEGION PLAQUE AT LIMA

NOBLE L. MARTIN, regimental champion of the 148th Infantry, Ohio National Guard, shot his way into the Allen County short-range small-bore rifle championship on the Lost Creek County Club Range, near Lima, July 4. Firing against 11 picked sharpshooters, he won the American Legion plaque for his total of 188 out of a possible 200 points, and the 100-yard championship of the county with 96 points out of a possible 100.

D. C. Place, vice president of the Lima Rifle and Revolver Club, won the 20-yard, small-bore pistol championship with a score of 89 out of a possible 100 points on the standard decimal target. Place, who holds a national individual championship in the amateur classification of the United States Revolver Association, won the small-bore rifle championship last year. The Legion plaque, which he has held since last year, will be awarded to Martin.

A feature of the tourney was the shoot-off of a tie score for the 50-yard individual championship by R. S. Marshall and J. J. Anderson. Both tied with a 95, and Marshall, firing the course again, made a 96, while Anderson slumped to an 89. Anderson sprang a surprise with his 95. He is a veteran of the Spanish-American War, with service in the Philippines.

In winning the county championship, Martin failed to lower the record of 192, made by Place last year. Place firing early in the morning obtained a total of 186 to tie R. S. Marshall for third place, and the competitors realized the fish-tail wind headon would prove difficult for the 22's. Lieutenant Martin was a member of the Ohio National Guard team at Perry in 1925.

L. W. Hughes and R. G. Patterson, the latter Secretary of the L. R. & R. Club, shot a hard match to tie for second place, one point below the championship. Each took the same score at the respective range—namely, 93 at 50 and 94 at 100 yards.

BURBANK GETS FRONT-PAGE PUBLICITY

ON THE morning of June 1 the Burbank (Calif.) *Daily Press* carried a full-column front-page news article about the local club and the State tryouts scheduled to be held out there. It was quite an interesting article "contributed by a member of the Burbank Rifle and Revolver Club," and was no doubt a good boost for rifle-shooting in that city.

Following a brief outline of the club's history the establishment of an up-to-date outdoor range and the mentioning of other local activities of interest to shooters out there, the article cited the coming along of Ned Cutting, that well-known ardent shooter, who has helped so many young rifle clubs in taking the right initiative steps.

It was through Mr. Cutting, the N. R. A. State Secretary for California, that arrangements were made for the staging of the State tryouts at Burbank. This having been satisfactorily arranged, the next step was to raise the necessary money which would be needed to swing the shoot. A little difficulty was contemplated in this connection, but was never fully realized. Rather, this obstacle soon vanished when, on calling on the City Council and local Chamber of Commerce, the committee was told that the club's request for financial aid would be favorably considered by each organization. With the further financial aid of several interested public-spirited Burbank sportsmen, the needed cash was immediately raised and plans for the shoot completed.

Results of the State tryouts are not known at this writing, but will be printed in a near future issue. In view of the interest in the several preliminary tryouts that already have been held, it is safe to predict that as a result of the final elimination, a team which will give the usual splendid account of itself will be selected to represent California at the National Matches this fall.

The increasing interest in rifle-shooting and its growing popularity throughout the State of California also received mention in the San Francisco *Chronicle*, Mr. Leo K. Wilson, editor of *Fish and Game*, writing at some length on the subject. Mr. Wilson brought out the point that a widespread knowledge of rifle-shooting led to more effective conservation of game animals, as hunters became better acquainted with the game laws, and also with their own abilities and limitations in the use of the rifle, all of which results in fewer illegal killings and fewer wounded animals.

BEG PARDON

THE name of R. Z. Kirkpatrick, Balboa Heights, Canal Zone, was, through error, omitted from Official Bulletin No. 13, covering results of the N. A. R. Outdoor Rapid-Fire Pistol Match. Mr. Kirkpatrick's score was 341, and he is entitled to seventeenth place in the Rapid-Fire Pistol Match.

SANTA PAULA BEATS IDAHO

CAPTAINED by J. D. Coloney, Captain United States Marine Corps, the rifle team of the U. S. S. *Idaho* arrived in Santa Paula at 9 a. m., July 3, to meet a team from the Santa Paula Rifle Club, as part of the Independence Day celebration. The Army A course was fired.

At noon a barbecue of steak was served by F. G. Schulze and his committee. The match closed at 3 p. m., with the Santa Paula team leading by 79 points.

The team scores were: U. S. S. *Idaho:* H. H. Curley, 313; H. P. Vieira, 311; M. O. Wilson, 283; E. T. Henry, 273; and J. F. Miller, 310. Santa Paula: E. G. Gardner, 326; L. R. Orton, 311; W. C. Lair, 311; G. D. Atmore, 318; E. D. Stuart, 304.

LEHRITTER HIGH GUN IN COMPETITIVE SHOOT

THE Clarendon Rifle Club, of Brooklyn, N. Y., completed, on June 30, the first of their series of competitive shoots. Messrs. Lehritter and Kelly easily led the rest of the field, Lehritter outshooting Kelly by 1.09 per cent for the first honors in the form of a handsome medal.

The club has a 50-foot range, electrically lighted, gun room, and is well equipped from the shooter's point of view. Meetings and shoots are held weekly. N. R. A. Specification .22-caliber rifles are used exclusively.

Names of the shooters and their averages for the three months follow:

No.	Name	Average
1.	Lehritter	40.27
2.	Kelly	39.18
3.	Kulack	26.03
4.	Coyle (T)	23.44
5.	Paladino	20.49
6.	Hall	17.19
7.	Vera	16.48
8.	Lacey	11.49
9.	Coyle (E)	23.00
10.	Clark	13.00

THE OUTERS CLUB OF MOUNT VERNON IS HOST

ON Sunday, June 19, a small-bore invitation shoot was held by the Outers Club, Inc., of Mount Vernon, N. Y., at the Lodge. A score or more of prominent New York and New Jersey riflemen were guests of the club and were treated to a royal good time, which included a barbecue lunch and all that should go with an occasion of this kind.

Despite the fact that it rained practically all

day it was possible, on account of shooting from a shelter, to fire over the Dewar Course, which means that each man fired 20 shots at 50 and 20 shots at 100 yards with iron sights.

George Sheldon, who has been shooting them up lately, was returned the winner with the excellent total of 392, which was a good score considering the conditions.

In the afternoon there was a Swiss Match at 200 yards, and Sheldon was not ruled out of the match until he had scored 10 bull's-eyes.

The first three or four winners in each match received some fine merchandise prizes as a reward for braving the elements and putting on a better demonstration than their less unfortunate brothers.

The Outers Club is an organization of men who like to shoot; but, besides that the good sportsmen who form the limit of membership appreciate that good fellowship is closely linked with the sport of shooting. Perhaps if some other clubs who bear down too much on shooting were to follow the example of the Outers Club there might be greater interest in the organization. The Outers Club have the right idea. We will never turn down an invitation to be a guest at the Outers' Club Lodge, short of being laid up with two broken legs or completely paralyzed.

The following were some of the high scores made:

PRIZE WINNERS—DEWAR COURSE

George Sheldon....	392	C. S. Meyers.....	383
W. A. Tewes.....	388	L. T. Everett.....	381
L. B. Holler, Jr..	383	Thomas Mullen....	380
Fred Anderson....	383	C. St. John.....	379

SWISS MATCH

Geo. Sheldon..	10 Bulls	Frank Kahrs..	5 Bulls
H. Von Heyn.	9 Bulls	W. A. Herring	3 Bulls
Fred Cole....	7 Bulls		

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1,000-YARD INDIVIDUAL MATCH

Name and address	Score
1. E. N. Moor, Jr., Los Angeles, Calif.	100
2. E. H. Bucknell, Seattle, Wash.	100
3. Roy W. Jellison, Monroe, Wash.	99
4. W. G. Jones, Jacksonville, Fla.	99
5. C. E. Nordhus, Highland Park, Ill.	98
6. Henry L. Day, Wallace, Idaho	98
7. M. M. Works, San Antonio, Tex.	97
8. J. O. Norcoss, Worcester, Mass.	97
9. S. C. Williams, Oakland, Calif.	97
10. R. G. Weidenheim, Chicago, Ill.	96
11. G. L. Cutting, Worcester, Mass.	95
12. O. T. D. Brandt, Seattle, Wash.	95
13. Mike Kinsella, Wallace, Idaho	94
14. A. C. Atherton, Chicago, Ill.	94
15. A. R. Smith, Toledo, Ohio	93
16. E. L. Best, Wallace, Idaho	93
17. George Tabor, Wallace, Idaho	92
18. W. B. Heitfeld, Wallace, Idaho	92
19. C. B. Gordon, San Jose, Calif.	91
20. J. H. Perozzi, San Luis Obispo, Calif.	89
21. C. E. Stodter, Quarry Heights, Canal Zone	89
22. H. M. Hendrix, Los Gatos, Calif.	89
23. H. C. Walter, Saratoga, Calif.	89
24. A. R. Bodenschatz, San Jose, Calif.	88
25. Hubert S. Miller, Fort du Pont, Del.	88
26. John Ruebke, Wallace, Idaho	86
27. A. B. Sprague, Worcester, Mass.	84
28. J. R. Doyne, Oakland, Calif.	84
29. C. A. Dority, Toledo, Ohio	80
30. R. B. Miller, Toledo, Ohio	80
31. Carl S. Mundy, Toledo, Ohio	75
32. Giles J. Mundy, Toledo, Ohio	71

UNABLE TO FIRE

George W. Benvie, Hatch, N. Mex.
Earl C. Evans, Pocatello, Idaho.

NOT REPORTED

A. J. Davidson, Chicago, Ill.
Frank R. Gates, Tacoma, Wash.
Harry James, Wallace, Idaho.
Martin Kiebert, Wallace, Idaho.
Ernest Nelson, Hutchinson, Minn.
E. W. Phillips, Wallace, Idaho.
C. V. Schmitt, Minneapolis, Minn.
Chester H. Wilson, Ortega, Fla.
Marcus C. Dolson, San Leandro, Calif.
Henry W. Gerrans, Balboa Heights, C. Z.
Eric Johnson, Ardmore, Okla.
Wm. McNamee, Jacksonville, Fla.
O. B. Olson, Frazee, Minn.
C. W. Randall, Alameda, Calif.
Earl Smith, Wallace, Idaho.

OFFICIAL BULLETIN NO. 16. July 15, 1927

N. R. A. SPRING PISTOL CHAMPIONSHIP MATCH

Name and address	Score
1. I. G. McQueen, Moulton, Iowa	286
2. Michael J. Reilly, Long Island City, N. Y.	275
3. Edgar T. Strange, Hershey, Pa.	272
4. J. S. Crowther, Toledo, Ohio	263
5. Aaron R. Smith, Toledo, Ohio	261
6. A. E. Hertzler, Halstead, Kans.	260
7. H. G. Mauk, Woodlawn, Pa.	254
8. C. A. Dority, Toledo, Ohio	252
9. De F. T. Layton, Brooklyn, N. Y.	252
10. A. E. Hart, Cleveland, Ohio	248
11. Jacob Bernson, Ancon, Canal Zone	244
12. H. F. Baloun, Cleveland, Ohio	240
13. Leo M. Reihsen, Ontario, Calif.	235
14. E. W. Davis, Cambridge, Mass.	235
15. H. R. Brunton, Malden, Mass.	234
16. Jim Barlow, Halstead, Kans.	232
17. F. G. H. Guenther, Salt Lake City, Utah.	231
18. L. E. Peterson, Santa Ana, Calif.	214
19. C. E. F. LeRoy, San Luis Obispo, Calif.	207
20. J. H. Perozzi, San Luis Obispo, Calif.	205
21. G. B. Davidson, Lebanon, Va.	184
22. Cleo Peterman, Toledo, Ohio	140

NOT REPORTED

C. R. Burdette, Baltimore, Md.
W. S. Gibbons, Melrose, Mass.
Abbott A. Lane, New Rochelle, N. Y.
Paul R. Mason, Ayer, Mass.
Chester H. Wilson, Ortega, Fla.
A. B. Eisenberg, Cleveland, Ohio.
Leo Gratcofsky, Kingston, Pa.
Geo. A. Marshall, Portland, Oreg.
Charles W. Sales, Salt Lake City, Utah.
Carl W. Wahrer, Sacramento, Calif.

OFFICIAL BULLETIN NO. 17. JULY 15, 1927

N. R. A. SPRING REVOLVER CHAMPIONSHIP MATCH

Name and address	Score
1. Harry S. Menkel, New York City, N. Y.	284
2. Edgar T. Strange, Hershey, Pa.	283
3. I. G. McQueen, Moulton, Iowa	280
4. J. Fred Engert, Herkimer, N. Y.	279
5. J. S. Crowther, Jr., Toledo, Ohio	273
6. George F. Ream, Wilkes-Barre, Pa.	273
7. Geo. A. Marshall, Portland, Oreg.	269
8. Jim Barlow, Halstead, Kans.	266
9. A. E. Hart, Cleveland, Ohio	265
10. T. T. McClure, Santa Monica, Calif.	264
11. L. K. Roberts, Long Beach, Calif.	264
12. A. E. Hertzler, Halstead, Kans.	263
13. R. M. Hussey, Woodlawn, Pa.	261
14. H. G. Mauk, Woodlawn, Pa.	256
15. De F. T. Layton, Brooklyn, N. Y.	253
16. Edgar W. Davis, Cambridge, Mass.	252
17. A. L. Bowker, Wentworth Location, N. H.	252
18. L. E. Peterson, Santa Ana, Calif.	249
19. H. R. Brunton, Malden, Mass.	248
20. L. H. Lavinske, Wausau, Wis.	244
21. G. F. H. Guenther, Salt Lake City, Utah.	243
22. W. A. Grear, Cleveland, Ohio	238
23. Hollis Harrison, Beverly, Mass.	236
24. G. A. Hughes, Youngstown, Ohio	232
25. O. D. Cox, Dante, Va.	232
26. G. B. Davidson, Lebanon, Va.	217

NOT REPORTED

C. R. Burdette, Baltimore, Md.
T. F. Bridgland, St. Petersburg, Fla.
Elmer E. Davis, Toledo, Ohio.
Leo Gratcofsky, Kingston, Pa.
Abbott A. Lane, New Rochelle, N. Y.
Charles R. Palmer, Norwich, Conn.
Charles W. Sales, Salt Lake City, Utah.
Raymond J. Brown, New York City, N. Y.
H. F. Baloun, Cleveland, Ohio.
A. B. Eisenberg, Cleveland, Ohio.
V. E. Hornsten, Moulton, Iowa.
Roland E. Ream, Wilkes-Barre, Pa.

OFFICIAL BULLETIN NO. 18. JULY 15. 1927

N. R. A. SPRING .22 PISTOL CHAMPIONSHIP MATCH

Name and address	Score
1. Michael J. Reilly, Long Island City, N Y.	291
2. T. K. Lee, Birmingham, Ala.	291
3. E. Mannie, St. Louis, Mo.	286
4. J. F Engert, Mawhawk, N. Y.	285
5. Edgar T. Strange, Hershey, Pa.	285
6. J. S. Crowther, Jr., Toledo, Ohio.	285
7. Harry S. Menkel, New York City, N. Y.	285
8. William A. Johnson, Portland, Oreg.	280
9. George A. Marshall, Portland, Oreg.	280
10. T. T McClure, Santa Monica, Calif.	279
11. Jim Barlow, Halstead, Kans.	275
12. H. F. Baloun, Cleveland, Ohio	275
13. R. Z. Kirkpatrick, Balboa Heights, C. Z.	274
14. A. E. Hertzler, Halstead, Kans.	270
15. Arthur E. Hart, Cleveland, Ohio.	270
16. H. R. Brunton, Malden, Mass.	266
17. Chester A. Dority, Toledo, Ohio.	266
18. Kenneth W. Wright, Chanute, Kans.	265
19. Earl Roberts, Long Beach, Calif.	262
20. G. A. Hughes, Youngstown, Ohio.	261
21. Edgar W. Davis, Cambridge, Mass.	261
22. Felix G. H. Guenther, Salt Lake City, Utah.	261
23. William H. Boynton, Berkeley, Calif.	258
24. O. D. Cox, Dante, Va.	247
25. W. S. Gibbons, Melrose, Mass.	243
26. G. B. Davidson, Lebanon, Va.	230
27. T. P. Weston, Raleigh, N. C.	227

NOT REPORTED

M. J. Laughlin, Wilkinsburg, Pa.
C. R. Burdette, Baltimore, Md.
Carl A. Du Nah, Pasadena, Calif.
Don V. Gerkin, New York City, N. Y.
M. J. Laughlin, Wilkinsburg, Pa.
Lewis A. Shell, La Junta, Colo.
Elmer E. Davis, Toledo, Ohio.
R. G. Goss, Telephone, Tex.
Leo Gratkofsky, Kingston, Pa.
Paul R. Mason, Ayer, Mass.
Wm. H. Schulz, Cleveland, Ohio.

OFFICIAL BULLETIN NO. 19. JULY 18, 1927

FREE PISTOL MATCH

Name and address	Score
1. G. M. Upshaw, Whittier, Calif.	543
2. Abbott A. Lane, New Rochelle, N. Y.	527
3. Jim Barlow, Halstead, Kans.	509
4. L. K. Roberts, Long Beach, Calif.	503
5. Paul R. Mason, Ayer, Mass.	496
6. William H. Riddle, Seaside, Oreg.	482
7. T. T. McClure, Santa Monica, Calif.	482
8. R. O. Phillips, Yonkers, N. Y.	478
9. R. A. Compton, Balboa, Canal Zone	477
10. Edgar T. Strange, Hershey, Pa.	472
11. R. Z. Kirkpathick, Balboa Heights, C. Z.	466
12. Robert A. Weir, Hollywood, Calif.	464
13. David C. McNeill, Beverly, Mass.	461
14. L. E. Peterson, Santa Ana, Calif.	461
15. F. G. H. Guenther, Salt Lake City, Utah.	449
16. G. A. Hughes, Youngstown, Ohio	447
17. L. S. Townsend, Ancon, Canal Zone	445
18. O. D. Cox, Dante, Va.	419
19. Raymond J. Brown, New York City, N. Y.	418
20. A. E. Hertzler, Halstead, Kans.	418
21. G. B. Davidson, Lebanon, Va.	331

NOT REPORTED

Elmer E. Davis, Toledo, Ohio.
Harry S. Menkel, New York City, N. Y.
Charles W. Sales, Salt Lake City, Utah.
Leo Gracofsky, Kingston, Pa.
M. J. Laughlin, Wilkinsburg, Pa.
Earl H. Milliken, Oakland, Calif.
Carl W. Wahrer, Sacramento, Calif.

INDIVIDUAL POLICE SPRING PISTOL CHAMPIONSHIP

Name and address	Score
1. Thomas Girkout, Gatun, Canal Zone	244
2. H. G. Mauk, Woodlawn, Pa.	244
3. G. A. Marshall, Portland, Oreg.	242
4. Maurice B. O'Neil, New Orleans, La.	240
5. Edgar T. Strange, Hershey, Pa.	238
6. Harry A. Murphy, Pasadena, Calif.	238
7. I. G. McQueen, Moulton, Iowa.	237
8. L. W. Griffith, Independence, Iowa	236
9. George F. Ream, Wilkes-Barre, Pa.	235
10. A. E. Hertzler, Halstead, Kans.	233
11. O. D. Cox, Dante, Va.	227
12. Jim Barlow, Halstead, Kans.	227
13. G. A. Raab, Portland, Oreg.	213

NOT REPORTED

P. J. Bowker, Wentworth Location, N. H.
J. Fred Engert, Herkimer, N. Y.
George R. Spangler, Philadelphia, Pa.
C. R. Burdette, Baltimore, Md.
Eric Johnson, Ardmore, Okla.
C. L. Venard, Savannah, Mo.

OFFICIAL BULLETIN NO. 20. JULY 25, 1927

N. R. A. SPRING POLICE PISTOL TEAM CHAMPIONSHIP

Winner: Los Angeles Police Department, Los Angeles, Calif.

Arm, Colt's. Ammunition, Peters.

Name	First Stage	Second Stage	Third Stage	Total
G. Buckhanan...	99	94	50	243
W. A. Ross.....	93	96	50	239
C. E. Ward.....	98	91	50	239
Bartley	96	93	49	238
Cutting	98	90	49	238
				1,197

2. Pasadena Police Rifle and Revolver Club, Pasadena, Calif. 1,165
3. Canal Zone Police Pistol Team, Balboa Heights, Canal Zone..... 1,119
4. Cherokee County Vigilantes, Cherokee, Iowa 1,015
5. Police Section, Police and Fire Division, Balboa Heights, Canal Zone.. 938

OFFICIAL BULLETIN NO. 21. JULY 18, 1927

N. R. A. SPRING INTER-CLUB PISTOL TEAM MATCH

1. Wilkes-Barre Rifle Club, Wilkes-Barre, Pa.

Name	First Stage	Second Stage	Third Stage	Total
George Ream....	91	94	96	281
Harry Russ.....	93	95	93	281
Fred Henkle....	93	96	87	276
Harry Frohm....	90	88	91	269
Frank Frohm....	85	86	95	266
	452	459	462	1,373

Organization	Score
2. Toledo Rifle & Pistol Club, Toledo, Ohio	1,359
3. Company H 160th Infantry, California N. G., Pasadena, Calif.	1,354
4. Woodlawn Rifle Club, Woodlawn, Pa.	1,319
5 Cleveland Revolver Club, Cleveland, Ohio	1,315
6. Ancon Rifle and Pistol Club, Ancon, C. Z.	1,307

NOT REPORTED

Northeastern Ohio Gun and Country Club, Cleveland, Ohio.

OFFICIAL BULLETIN NO. 22. JULY 19, 1927

HIGH-POWER TWO-MAN-TEAM MATCH

Name and address	Score	Total
1. E. H. Bucknell, Seattle, Wash.	195	
O. T. D. Brandt, Seattle, Wash.	194	389
2. E. W. Phillips, Wallace, Idaho	188	
Earl Smith, Wallace, Idaho	184	372
3. A. B. Sprague, Worcester, Mass.	181	
J. O. Norcross, Worcester, Mass.	188	369
4. Aaron R. Smith, Toledo, Ohio	187	
Chester A. Dority, Toledo, Ohio	178	365
5. G. Barnhardt, Sandwich, Ill.	183	
Paul Oschida, Sandwich, Ill.	181	364
6. L. B. Weatherbee, Antioch, Calif.	179	
L. J. Vanderlundt, Antioch, Calif.	184	363
7. Mike Kinsella, Wallace, Idaho	183	
R. L. Best, Wallace, Idaho	180	363
8. H. S. Miller, Fort du Pont, Del.	180	
H. E. Fisher, Fort du Pont, Del.	178	358
9. J. H. Perozzi, San Luis Obispo, Calif.	184	
Peter Negranti, San Luis Obispo, Calif.	174	358
10. W. B. Heiffeld, Wallace, Idaho	173	
John Ruebke, Wallace, Idaho	184	357
11. Homer Elliott, San Luis Obispo, Calif.	180	
Fred Elliott, San Luis Obispo, Calif.	175	355
12. George Tabor, Wallace, Idaho	177	
Henry L. Day, Wallace, Idaho	177	354
13. H. W. Gerrans, Balboa Heights, Canal Zone	168	
C. E. Stodter, Quarry Heights, Canal Zone	180	348
14. F. E. Whipple, Mattapan, Mass.	174	
A. P. Danforth, Arlington, Mass.	172	346
15. E. H. Milliken, Oakland, Calif.	139	
H. D. Wilkinson, Oakland, Calif.	138	277

NOT REPORTED

Giles J. Mundy, Toledo, Ohio, paired with J. S. Crowther, Jr., Toledo, Ohio.
M. T. Konkright, Des Moines, Iowa, not selected.
W. B. Holden, Chicago, Ill., not selected.

OFFICIAL BULLETIN NO. 23. JULY 19, 1927

SMALL-BORE TWO-MAN-TEAM MATCH, ANY SIGHTS

Name and address	Score	Total
1. Bruce Wilson, Sapulpa, Okla.	397	
Joe Wilson, Sapulpa, Okla.	397	794
2. Frank W. Rogers, New Haven, Conn.	396	
James S. Stewart, New Haven, Conn.	391	787
3. Eric Johnson, Ardmore, Okla.	389	
F. L. Hoffman, Ardmore, Okla.	396	785
4. P. R. Lillibridge, Manchester, Iowa	396	
W. G. Crabb, Manchester, Iowa	389	785
5. H. W. T. Ross, Santa Barbara, Calif.	392	
H. F. Van Winkle, S. Barbara, Calif.	392	784
6. George Tabor, Wallace, Idaho	393	
Henry L. Day, Wallace, Idaho	391	784
7. A. K. Friedrich, Ames, Iowa	389	
J. V. McKelvey, Ames, Iowa	393	782
8. C. C. Held, Germansville, Pa.	390	
Geo. H. Sittler, Germansville, Pa.	392	782
9. F. C. Kimmel, St. Louis, Mo.	393	
Sydnor Hall, St. Louis, Mo.	388	781
10. Ralph Statler, Allentown, Pa.	388	
C. R. Brong, Allentown, Pa.	392	780
11. Leon Dezert, Pasadena, Calif.	396	
Carl A. Du Nah, Pasadena, Calif.	384	780
12. C. E. Scofield, Ortonville, Minn.	389	
M. V. Douthitt, Ortonville, Minn.	389	778
13. A. C. Atherton, Chicago, Ill.	392	
C. E. Nordhus, Highland Park, Ill.	386	778
14. R. B. O'Neill, Steubenville, Ohio.	388	
F. C. Boles, Steubenville, Ohio.	389	777
15 C. N. German, Germansville, Pa.	391	
F. P. Oswald, Germansville, Pa.	386	777
16. J. B. Currier, Glendale, Calif.	391	
W. K. Bowman, Glendale, Calif.	385	776
17. Harry Morrell, New Haven, Conn.	381	
H. J. Gussman, New Haven, Conn.	395	776
18. H. C. Hussner, Appleton, Wis.	387	
E. F. Grundeman, Appleton, Wis.	389	776
19. Henry Muntener, Union City, N. J.	389	
Jacob Muntener, Union City, N. J.	387	776
20. Frank E. Smith, Tulsa, Okla.	387	
Hugh H. Rife, Tulsa, Okla.	387	774
21. G. M. Upshaw, Whittier, Calif.	390	
F. K. Leffeingwell, Whittier, Calif.	383	773
22. C. De Long, Germansville, Pa.	378	
E. B. Hamm, Germansville, Pa.	394	772
23. Mike Kinsella, Wallace, Idaho	379	
R. L. Best, Wallace, Idaho	392	771
24. D. E. McConnell, Gastonia, N. C.	381	
F. Wilkerson, Gastonia, N. C.	390	771
25. L. P. Clubine, Aurora, Iowa	387	
J. J. Ingalls, Aurora, Iowa	384	771
26. H. M. Van Sleen, Gastonia, N. C.	389	
R. J. Frieze, Gastonia, N. C.	381	770
27. C. B. Palmer, Norwich, Conn.	382	
A. E. Stebbins, Jewett City, Conn.	387	769
28. H. W. Gerrans, Balboa Heights, C. Z.	389	
C. E. Stodter, Quarry Heights, C. Z.	380	769
29. J. R. Walker, Oak Park, Ill.	385	
G. A. Lindgren, Lyons, Ill.	383	768
30. C. H. Kline, Woolrich, Pa.	385	
C. L. Quiggle, Woolrich, Pa.	383	768
31. L. D. Moore, Hazleton, Iowa	383	
C. E. Reide, Hazleton, Iowa	385	768
32. E. B. Lloyd, Elgin, Ill.	377	
K. E. Lloyd, Elgin, Ill.	391	768
33. Walton Anderson, Gearhart, Oreg.	382	
Orlin Royce, Seaside Oreg.	384	766
34. R. B. Greig, Oak Park, Ill.	384	
K. W. Selander, Chicago, Ill.	380	764
35. Leslie Hamer, Primghar, Iowa	379	
Vere Homer, Primghar Iowa	385	764
36. Earl T. Walker, Oregon City, Oreg.	386	
A. H. Mielike, Oregon City, Oreg.	377	763
37. F. D. Hickock, Bradford Pa.	381	
J. K. Chamm, Bradford, Pa.	382	763
38. A. S. Dempsie, Seaside, Oreg.	381	
C. P. Smith, Seaside, Oreg	378	759
39. Frank L. Yoran, Tarrytown, N. Y.	372	
Paul Russell, Tarrytown, N. Y.	383	755
40. W. B. Heitfeld, Wallace, Idaho	364	
John Ruebke, Wallace, Idaho	390	754
41. J. S. Crowther, Jr., Toledo, Ohio	376	
Chester A. Dority, Toledo, Ohio	370	746
42. F. E. Passmore, Huntley, Ill.	366	
E. E. Richoz, Elgin, Ill.	369	735

UNABLE TO FIRE

J. H. Perozzi, San Luis Obispo, Calif., paired with P. Negranti, San Luis Obispo.

NOT REPORTED

H. W. Arndt, Frazee, Minn., paired with O. C. Olson, Frazee, Minn.
E. W. Phillips, Wallace, Idaho, paired with Earl Smith, Wallace, Idaho
R. G. Smith, Akron, Ohio, paired with V. Z. Canfield, Akron, Ohio.
C. U. Smith, Chicago, Ill., paired with W. J. White, Chicago, Ill.
W. E. Crain, Los Angeles, Calif., paired with Jack Miller, Los Angeles, Calif.

OFFICIAL BULLETIN NO. 24. JULY 21, 1927

AMERICAN INDIVIDUAL DEWAR MATCH, 1927

Name and address	Score
1. Henry W. Gerrans, Balboa, Canal Zone	395
2. J. B. Currier, Glendale, Calif.	394
3. Maurice Kaiser, Sacramento, Calif.	392
4. F. C. Kimmel, St. Louis, Mo.	392
5. Fred Johansen, Joliet, Ill.	391
6. J. G. Wright, Kansas City, Mo.	391
7. K. W. Selander, Chicago, Ill.	391
8. L. O. Moore, New Cumberland, Ohio	390
9. A. E. Hart, Cleveland, Ohio	389
10. W. S. Gibbons, Melrose, Mass.	389
11. R. B. Miller, Toledo, Ohio	389
12. G. Bernhardt, Sandwich, Ill.	388
13. F. W. Rogers, New Haven, Conn.	388
14. L. Berggren, Alexandria, Minn.	388
15. W. A. Johnson, Portland, Oregon	388
16. B. F. Whitney, Alexandria, Minn.	388
17. Jack Bassett, Great Falls, Mont.	387
18. J. S. Stewart, New Haven, Conn.	387
19. R. M. Johnston, Princeton, N. J.	387
20. R. E. McGerraugh, Manhattan, Kans.	387
21. E. J. Pelikan, St. Louis, Mo.	386
22. Robert Neill, Venice, Ohio	386
23. J. R. Walker, Oak Park, Ill.	386
24. C. E. Stodter, Quarry Heights, Canal Zone	385
25. C. S. Mundy, Toledo, Ohio	385
26. E. M. Kidder, Ayer, Mass.	385
27. H. H. Morrell, New Haven, Conn.	385
28. S. F. Benfer, Toledo, Ohio	384
29. C. A. Dority, Toledo, Ohio	384
30. W. K. Ballough, Balsam, N. C.	384
31. A. C. Atherton, Chicago, Ill.	384
32. C. I. Kephart, Punxsutawney, Pa.	384
33. Edson Klinkel, Toledo, Ohio	383
34. C. T. Westergard, Whiting, Iowa	383
35. Carl A. Du Nah, Pasadena, Calif.	382
36. E. P. Eckfeldt, Chicago, Ill.	382
37. G. A. Lindgren, Lyons, Ill.	381
38. H. J. Martin, Monterey, Calif.	380
39. W. M. Hire, Castalia, Ohio	380
40. M. R. Coleman, Pittsburgh, Pa.	380
41. B. A. Courtright, Wilkes-Barre, Pa.	379
42. Harry Frohm, Wilkes-Barre, Pa.	379
43. C. Myre, St. Louis, Mo.	378
44. G. A. Hughes, Youngstown, Ohio	377
45. Charles A. Nye, New Washington, Ohio	376
46. G. W. Benvie, Hatch, N. Mex.	376
47. W. H. Gould, West Toledo, Ohio	375
48. W. C. Tarr, Carmel, Calif.	375
49. R. L. Proffitt, Crawfordsville, Iowa	374
50. Robert A. Weir, Hollywood, Calif.	374
51. A. P. Danforth, Arlington, Mass.	374
52. L. E. Gates, Emlenton, Pa.	373
53. Frank Frohm, Wilkes-Barre, Pa.	373
54. Daniel Beals, No. Kansas City, Mo.	369
55. E. H. Conant, St. Louis, Mo.	368
56. Sherwin Murphy, Chicago, Ill.	363
57. R. M. Bair, Hummelstown, Pa.	362
58. H. Carstenson, Elk Horn, Iowa	362
59. E. M. Farris, Portsmouth, Ohio	359
60. E. C. Evans, Pocatello, Idaho	357
61. F. J. Griffin, Raleigh, N. C.	347
62. W. H. Schulz, Cleveland, Ohio	346
63. C. P. Beals, No. Kansas City, Mo.	337

DISQUALIFIED—USED GLASS SIGHTS

F. E. Whipple, Milton Park, Mass.

NOT REPORTED

A. I. Arneson, Austin, Minn.
J. S. Crowther, Jr., Toledo, Ohio.
R. E. Chappell, St. Louis, Mo.
Andrew Elliott, Elk Grove, Calif.
Forest J. Fleming, Fresno, Calif.
F. Hehenbarth, St. Louis, Mo.
R. K. Jones, St. Louis, Mo.
Helgo Johnson, Joliet, Ill.
Harvey King, Kalamazoo, Mich.
C. H. Kleist, St. Louis, Mo.
Emile Mannie, St. Louis, Mo.
R. J. McDonald, St. Louis, Mo.
Clifford A. Martin, Elk Grove, Calif.
Sheldon W. Neill, Venice, Ohio.
R. H. Pool, Youngstown, Ohio.
Michael J. Reilly, Long Island City, N. Y.
Fred C. Todd, Fresno, Calif.
D. W. Wood, Dallas, Tex.
G. H. Buchanan, St. Louis, Mo.
George L. Cutting, Worcester, Mass.
Elmer E. Davis, Toledo, Ohio.
R. B. Greig, Oak Park, Ill.
P. E. James, Elk Horn, Iowa.
T. C. Johnson, St. Louis, Mo.
Eric Johnson, Ardmore, Okla.
H. A. Kinnaman, Crawfordsville, Ind.
Lawrence K. Lapinske, Wausau, Wis.
William McNamee, Jacksonville, Fla.
T. T. McClure, Santa Monica, Calif.
J. P. Nielson, Elk Grove, Iowa.
M. M. Pond, Great Falls, Mont.
J. H. Robinson, St. Louis, Mo.
J. D. Standish, St. Louis, Mo.
Chester H. Wilson, Ortega, Fla.

OFFICIAL BULLETIN NO. 25. JULY 22, 1927

INDIVIDUAL 200-YARD SMALL-BORE SPRING CHAMPIONSHIP MATCH

Name and address	Score
1. H. C. Wright, Fresno, Calif.	100-20v
2. T. K. Lee, Birmingham, Ala.	100-19v
3. Francis Wood, New York City, N. Y.	100-18v
4. H. F. Van Winkle, S. Barbara, Calif.	100-15v
5. C. H. Kline, Woolrich, Pa.	100-14v
6. L. H. Lapinske, Wausau, Wis.	100-13v
7. F. C. Kimmel, St. Louis, Mo.	100-12v
8. Eric Johnson, Ardmore, Okla.	99-11v
9. A. E. Hart, Cleveland, Ohio	99- 9v
10. G. A. Lindgren, Lyons, Ill.	99- 9v
11. J. R. Walker, Oak Park, Ill.	99- 6v
12. C. E. Scofield, Ortonville, Minn.	98
13. L. O. Moore, New Cumberland, Ohio.	98
14. Leon Dezert, Pasadena, Calif.	98
15. L. E. Gates, Honeeye Falls, N. Y.	98
16. C. S. Mundy, Toledo, Ohio	98
17. G. M. Upshaw, Whittier, Calif.	98
18. R. B. Miller, Toledo, Ohio	98
19. Richard Dunlap, Sapulpa, Okla.	98
20. A. C. Percy, Schenectady, N. Y.	98
21. W. S. Gibbons, Melrose, Mass.	98
22. A. K. Friedrich, Ames, Iowa	98
23. M. V. Douthitt, Ortonville, Minn.	97
24. R. M. Bair, Hummelstown, Pa.	97
25. A. P. Danforth, Arlington, Mass.	97
26. B. F. Whitney, Alexandria, Minn.	97
27. H. W. T. Ross, S. Barbara, Calif.	97
28. C. A. Du Nah, Pasadena, Calif.	97
29. C. E. Nordhus, Highland Park, Ill.	97
30. H. J. Martin, Monterey, Calif.	97
31. H. E. Brill, Tulsa, Okla.	96
32. G. Bernhardt, Sandwich, Ill.	96
33. R. G. Smith, Akron, Ohio	96
34. R. L. Proffitt, Crawfordsville, Ind.	96
35. Arthur Lammli, Stanton, Nebr.	96
36. E. B. Lloyd, Elgin, Ill.	96
37. Andrew Dickerson, Akron, Ohio	96
38. S. F. Benfer, Toledo, Ohio	96
39. Edson Klinkel, Toledo, Ohio	96
40. Eric H. Lindhal, Scotia, N. Y.	95
41. L. M. Reihsen, Ontario, Calif.	94
42. G. J. Weidmaier, Dunkirk, N. Y.	93
43. Eral C. Evans, Pocatello, Idaho	93
44. Giles J. Mundy, Toledo, Ohio	93
45. A. M. Roberts, Southbridge, Mass.	93
46. Warren C. Tarr, Carmel, Calif.	93
47. R. W. Magee, Brewster, Ohio	93
48. G. A. Hughes, Youngstown, Ohio	93
49. Chester A. Dority, Toledo, Ohio	93
50. W. A Johnson, Portland, Oreg.	92
51. W. M. Hire, Castalia, Ohio	92
52. Paul Oschida, Sandwich, Ill.	92
53. James G. Fritz, State College, Pa.	92
54. J. F. Woolshlager, Castorland, N. Y.	91
55. T. E Wingertzahn, Dunkirk, N. Y.	91
56. F. E. Whipple, Milton Park, Mass.	90
57. C. L. Quiggle, Woolrich, Pa.	90
58. Kenneth E. Lloyd, Elgin, Ill.	90
59. R. M. Johnston, Princeton, N. J.	89
60. K. W. Wright, Chanute, Kans.	89
61. C. I. Kephart, Punxstawney, Pa.	87
62. A. G. Nelson, Jr., Chanute, Kans.	85
63. Charles A. Nye, New Washington, Ohio.	86
64. D. H. Nelson, Ontario, Calif.	85
65. R. W. Hawthorne, Elgin, Ill.	81
66. K. W. Selander, Chicago, Ill.	78
67. W. H. Schulz, Cleveland, Ohio.	72

NOT REPORTED

A. I. Arneson, Austin, Minn.
Nick Altman, Lu Verne, Iowa.

George L. Cutting, Worcester, Mass.
J. B. Currier, Glendale, Calif.
A. J. Davidson, Chicago, Ill.
R. B. Greig, Oak Park, Ill.
V. E. Hornsten, Moulton, Iowa.
Harvey King, Kalamazoo, Mich.
W. J. G. Land, Chicago, Ill.
Robert Neill, Venice, Ohio.
R. H. Pool, Youngstown, Ohio.
C. E. Stodter, Quarry Heights, C. Z.
Ivan Whiting, Plymouth, Wis.
A. C. Atherton, Chicago, Ill.
Leonard Berggron, Alexandria, Minn.
J. S. Crowther, Jr., Toledo, Ohio.
Elmer E. Davis, Toledo, Ohio.
A. B. Eisenberg, Cleveland, Ohio.
William H. Gould, Ames, Iowa.
Fred Johansen, Joliet, Ill.
H. A. Kinnaman, Crawfordsville, Ind.
J. O. Norcross, Worcester, Mass.
Martin O'Connor, Racine, Wis.
Walter L. Seamans, Casper, Wyo.
Roscoe Vernon, Glenarm, Ill.
Chester H. Wilson, Ortega, Fla.

CALKINS FIELD OPENS AT SPRINGFIELD

THE Springfield Revolver Club officially opened its new range in Agawam, styled Calkins Field, recently with a large crowd in attendance. Although the high wind and rain prevented any serious target work, the range was busy all day with marksmen from this city, North Adams, Pittsfield, Hartford and Whitinsville on hand.

In the Pistol Match, after four men had tied for top honors, M. H. Bingham, of this city, won in the eliminations. George R. Brown, of Pittsfield, captured the Revolver Match.

The new range, ideally located in a large field about one-half mile long and 700 feet wide, is completely equipped with five steel-back ranges. The ranges are 25 yards, 50 yards and 50 meters, while there are 50-yard and 100-yard ranges for small-bore rifles. The targets are up against Federal Hill.

—*Springfield Sunday Union and Republican.*

TEXAS STATE RIFLE ASSOCIATION MATCH RESULTS

THE Seventh Annual Matches of the Texas State Rifle Association—the pistol events of the program fired at San Antonio, July 3-4, and the rifle matches held in Austin June 13 to 16, inclusive—were favorably attended by both shooters and spectators. In the absence of a general report covering details of the shoot the names and scores of the high men in all matches fired are given:

MATCH NO. 1

No.	Name and address	Score
1.	H. P. Wells, San Antonio	46
2.	M. M. Works, Amarillo	45
3.	Lt. G. H. Bare, Fort Sam Houston	45
4.	M. Kraus, Austin	44
5	B. F. Thompson, San Antonio	44
6.	H. Chelf, Houston	43
7.	G. Corning, El Paso	43
8.	Capt. B. E. Cooper, Fort Sam Houston	43
9.	T. Armstrong, Austin	43
10.	Sergeant Slatton, Fort Sam Houston	42

MATCH NO. 2

No.	Name and address	Score
1.	J. F. Callan, Austin	92
2.	M. M. Works, Amarillo	91
3.	Capt. B. E. Cooper, Fort Sam Houston	89
4.	Lt. G. H. Bare, Fort Sam Houston	88
5.	Sergeant Wheeler, Fort Sam Houston	86
6.	Sergeant Hendrickson, Fort Sam Houston	86
7.	T. Armstrong, Austin	85
8.	Sergeant Bieber, Fort Sam Houston	85
9.	J. Grist, Austin	85
10.	M. Kreuz, Austin	85

MATCH NO. 3

No.	Name and address	Score
1.	J. C. Talcott, San Antonio Plus 19 bulls.	50
2.	J. Raven, Austin Plus 15 bulls.	50
3.	G. Corning, El Paso	49
4.	Capt. B. E. Cooper, Fort Sam Houston	49
5.	H. Chelf, Houston	49
6.	B. F. Thompson, San Antonio	49
7.	Sergeant Hendrickson, Fort Sam Houston	48
8.	M. Kreuz, Austin	48
9.	W. H. O. Johnson, El Paso	48
10.	G. L. Peterson, Austin	47

MATCH NO. 4

No.	Name and address	Score
1.	E. Adams, San Antonio Plus 7 bulls.	50
2.	M. M. Works, Amarillo Plus 5 bulls.	50
3.	J. Grist, Austin Plus 2 bulls.	50
4.	Sergeant Jacobson, Fort Sam Houston	49
5.	G. Corning, El Paso	49
6.	J. Raven, Austin	49
7.	T. Armstrong, Austin	49
8.	Sergeant Wheeler, Fort Sam Houston	49
9.	W. L. Riddle, Austin	49
10.	M. Kreuz, Austin	49

MATCH NO. 5

No.	Name and address	Score
1.	G. Corning, El Paso	97
2.	Sergeant C. Jacobson, Fort Sam Houston	95
3.	J. Raven, Austin	94
4.	T. Armstrong, Austin	94
5.	G. L. Peterson, Austin	94
6.	B. J. Ruppert, Austin	94
7.	B. Haig, El Paso	93
8.	Sergeant Brooks, Fort Sam Houston	92
9.	Sergeant Hendrickson, Fort Sam Houston	92
10.	M. M. Heins, El Paso	91

MATCH NO. 6

No.	Name and address	Score
1.	Lieutenant G. H. Bare, Fort Sam Houston	90
2.	Sergeant Wheeler, Fort Sam Houston	89
3.	M. M. Works, Amarillo	88
4.	J. C. Talcott, San Antonio	87
5.	Sergeant C. Jacobson, Fort Sam Houston	87
6.	G. Corning, El Paso	87
7.	Sergeant Slatton, Fort Sam Houston	86
8.	G. L. Peterson, Austin	86
9.	M. M. Heins, El Paso	86
10.	W. H. O. Johnson, El Paso	84

MATCH NO. 7

No.	Name and address	Score
1.	M. M. Works, Amarillo	94
2.	Sergeant Hendrickson, Fort Sam Houston	94
3.	G. Corning, El Paso	93
4.	W. H. O. Johnson, El Paso	91
5.	J. Grist, Austin	90
6.	T. Armstrong, Austin	89
7.	M. M. Heins, El Paso	89
8.	G. L. Peterson, Austin	89
9.	M. Kreuz, Austin	88
10.	J. Raven, Austin	88

MATCH NO. 8

No.	Name and address	Score
1.	W. H. O. Johnson, El Paso	143
2.	M. M. Works, Amarillo	143
3.	Sergeant Slatton, Fort Sam Houston	142
4.	Captain B. E. Cooper, Fort Sam Houston	141
5.	H. P. Wells, San Antonio	140
6.	C. J. Talcott, San Antonio	139
7.	Sergeant Bieber, Fort Sam Houston	139
8.	M. Kreuz, Austin	137
9.	Sergeant C. Jacobson, Fort Sam Houston	136
10.	Sergeant Hendrickson, Fort Sam Houston	135

MATCH NO. 9

No.	Name and address	Score
1.	C. J. Talcott, San Antonio	60
2.	J. Raven, Austin	57
3.	H. P. Wells, San Antonio	57
4.	T. Armstrong, Austin	52
5.	Ad. L. Forke, New Braunfels	30

MATCH NO. 10

No.	Name and address	Score
1.	J. E. Callan, Austin	48
2.	Captain B. E. Cooper, Fort Sam Houston	47
3.	Sergeant Slatton, Fort Sam Houston	47
4.	B. F. Thompson, San Antonio	46
5.	H. P. Wells, San Antonio	46
6.	M. M. Works, Amarillo	46
7.	G. Corning, El Paso	46
8.	Lieutenant G. H. Bare, Fort Sam Houston	45
9.	Sergeant Brooks, Fort Sam Houston	45
10.	Sergeant Bieber, Fort Sam Houston	45

MATCH NO. 11

No.	Name and address	Score
1.	G. L. Peterson, Austin	45
2.	Adjutant L. Forke, New Braunfels	45
3.	Lieutenant M. Alexander, Fort Sam Houston	45
4.	M. M. Works, Amarillo	44
5.	Sergeant Hendrickson, Fort Sam Houston	43
6.	Captain B. E. Cooper, Fort Sam Houston	43
7.	T. Armstrong, Austin	43
8.	Sergeant Wheeler, Fort Sam Houston	42
9.	Sergeant Brooks, Fort Sam Houston	41
10.	J. Raven, Austin	41

MATCH NO. 12

No.	Name and address	Score
1.	C. J. Talcott, San Antonio Plus 11 bulls.	75
2.	Capt. B. E. Cooper, Fort Sam Houston	74
3.	T. Burdette, Austin	73
4.	J. Raven, Austin	73
5.	G. L. Peterson, Austin	72
6.	Sergeant Loomis, Fort Sam Houston	72
7.	M. M. Works, Amarillo	72
8.	B. F. Thompson, San Antonio	72
9.	Lt. G. H. Bare, Fort Sam Houston	71
10.	J. Grist, Austin	70

MATCH NO. 13

No.	Name and address	Score
1.	Captain B. E. Cooper, Fort Sam Houston	99
2.	Sergeant C. Jacobson, Fort Sam Houston	99
3.	C. J. Talcott, San Antonio	98
4.	M. M. Works, Amarillo	98
5.	E. Adams, San Antonio	97
6.	Sergeant Hendrickson, Fort Sam Houston	96
7.	T. Armstrong, Austin	94
8.	Lt. G. H. Bare, Fort Sam Houston	93
9.	Sergeant Slatton, Fort Sam Houston	92
10.	T. Burdette, Austin	92

MATCH NO. 14

No.	Name and address	Score
1.	G. Corning, El Paso	99
2.	G. L. Peterson, Austin	99
3.	Lieutenant G. H. Bare, Fort Sam Houston	98
4.	C. J. Talcott, San Antonio	97
5.	Lieutenant M. Alexander, Fort Sam Houston	97
6.	Sergeant Bieber, Fort Sam Houston	96
7.	T. Armstrong, Austin	96
8.	Sergeant Slatton, Fort Sam Houston	96
9.	Sergeant Brooks, Fort Sam Houston	96
10.	W. H. O. Johnson, El Paso	95

MATCH NO. 15

No.	Name and address	Score
1.	Captain B. E. Cooper, Fort Sam Houston	47
2.	Lieutenant G. H. Bare, Fort Sam Houston	47
3.	J. Raven, Austin	46
4.	Adjutant L. Forke, New Braunfels	45
5.	H. Chelf, Houston	44
6.	Sergeant Bieber, Fort Sam Houston	43
7.	G. Corning, El Paso	43
8.	Sergeant Hendrickson, Fort Sam Houston	41
9.	Sergeant C. Jacobson, Fort Sam Houston	41
10.	Sergeant Brooks, Fort Sam Houston	40

MATCH NO. 16

No.	Name and address	Score
1.	H. P. Wells, San Antonio	98
2.	Sergeant Brooks, Fort Sam Houston	98
3.	Captain B. E. Cooper, Fort Sam Houston	98
4.	B. F. Thompson, San Antonio	97
5.	M. M. Works, Amarillo	97
6.	C. J. Talcott, San Antonio	96
7.	Sergeant Slatton, Fort Sam Houston	94
8.	M. Kreuz, Austin	94
9.	T. Burdette, Austin	94
10.	J. Grist, Austin	94

MATCH NO. 17

No.	Organization and address	Score
1.	Liberty Pistol & Rifle Club, San Antonio	536
2.	Austin Rifle Club, Austin	524
3.	Ninth Infantry, U. S. Army, Fort Sam Houston	517
4.	Liberty Pistol & Rifle Club, No. 2, San Antonio	509

MATCH NO. 18

No.	Name and address	Score
1.	C. Wilkinson, San Antonio	132
2.	H. P. Wells, San Antonio	127
3.	D. Roberts, San Antonio	121

MATCH NO. 19

No.	Name and address	Score
1.	M. M. Works, Amarillo	371
2.	G. Corning, El Paso	359
3.	W. H. O. Johnson, El Paso	358
4.	H. P. Wells, San Antonio	357
5.	Captain B. E. Cooper, Fort Sam Houston	355
6.	Sergeant Bieber, Fort Sam Houston	355
7.	M. M. Heins, El Paso	354
8.	M. Kreuz, Austin	352
9.	Sergeant Hendrickson, Fort Sam Houston	352
10.	Sergeant C. Jacobson, Fort Sam Houston	352

MATCH NO. 20

No.	Name and address	Score
1.	G. Corning, El Paso	326
2.	J. F. Callan, Austin	320
3.	Lieutenant G. H. Bare, Fort Sam Houston	319
4.	Sergeant Bieber, Fort Sam Houston	317
5.	T. Armstrong, Austin	317
6.	M. M. Works, Amarillo	316
7.	Captain B. E. Cooper, Fort Sam Houston	313
8.	Sergeant C. Jacobson, Fort Sam Houston	311
9.	M. Kreuz, Austin	310
10.	Sergeant Hendrickson, Fort Sam Houston	310

PISTOL MATCHES

MATCH No. 1

No.
1. Liberty Pistol and Rifle Club, No. 1, San Antonio:

Name	Score
Sergeant W. J. Reed	264 x 300
G. H. Collins	262
M. M. Works	262
A. B. Fest	244
Total	1,023

2. Liberty Pistol and Rifle Club, No. 2, San Antonio:

Name	Score
L. L. Cline	265
Sergeant C. Jacobson	253
A. O. Nissen	235
C. J. Talcott	223
Total	966

3. Fort Worth Rifle and Pistol Club, Fort Worth:

Name	Score
G. W. Clendon	253
F. B. Naill	226
R. L. Vanstory	223
F. C. Brown	181
Total	883

MATCH No. 2

No.	Name and address	Score
1.	A. B. Fest, San Antonio	93
2.	Sergeant W. J. Reed, Fort Sam Houston	90
3.	G. H. Collins, San Antonio	87
4.	D. Nissen, San Antonio	86
5.	J. F. Callan, Austin	86

MATCH No. 3

No.	Name and address	Score
1.	Sergeant W. J. Reed, Fort Sam Houston	97
2.	B. F. Thompson, San Antonio	96
3.	J. F. Callan, Austin	94
4.	G. H. Collins, San Antonio	93
5.	R. L. Vanstory, Fort Worth	92

MATCH No. 4

No.	Name and address	Score
1.	G. H. Collins, San Antono	89
2.	M. M. Works, Amarillo	87
3.	Sergeant W. J. Reed, Fort Sam Houston	86
4.	J. F. Callan, Austin	81
5.	A. B. Fest, San Antonio	81

MATCH No. 5

No.	Name and address	Score
1.	Sergeant W. J. Reed, Fort Sam Houston	266
2.	M. M. Works, Amarillo	262
3.	J. F. Callan, Austin	260
4.	B. F. Thompson, San Antonio	251
5.	G. H. Collins, San Antonio	242

MATCH No. 6

No.	Name and address	Score
1.	Sergeant W. J. Reed, Fort Sam Houston	539
2.	J. F. Callan, Austin	521
3.	M. M. Works, Amarillo	515
4.	G. H. Collins, San Antonio	511
5.	A. B. Fest, San Antonio	498

MATCH No. 7

No.	Name and address	Score
1.	G. W. Clendon, Fort Worth	143
2.	A. O. Nissen, San Antonio	142
3.	B. F. Thompson, San Antonio	139
4.	F. C. Brown, Fort Worth	138
5.	M. M. Works, Amarillo	136

MATCH No. 8

No.	Name and address	Score
1.	G. W. Clendon, Fort Worth	266
2.	A. B. Fest, San Antonio	263
3.	Sergeant C. Jacobson, Fort Sam Houston	260
4.	A. O. Nissen, San Antonio	255
5.	F. B. Naill, Fort Worth	232

MATCH No. 9

No.	Name and address	Score
1.	Sergeant W. J. Reed, Fort Sam Houston	289
2.	M. M. Works, Amarillo	286
3.	J. F. Callan, Austin	276
4.	G. H. Collins, San Antonio	266
5.	A. O. Nissen, San Antonio	265

MATCH No. 10

No.	Name and address	Score
1.	G. W. Clendon, Fort Worth	189
2.	A. O. Nissen, San Antonio	185
3.	Sergeant W. J. Reed, Fort Sam Houston	175
4.	J. Raven, Austin	147
5.	G. H. Collins, San Antonio	142

MATCH No 11

No.	Name and address	Score
1.	F. C. Brown, Fort Worth	236
2.	S. Morton, San Antonio	215

Only two men fired in this match.

MATCH No. 12*

No.	Name and address	Score
1.	J. F. Callan, Austin	841
2.	M. M. Works, Amarillo	831
3.	J. Raven, Austin	776
4.	Captain B. E. Cooper, Fort Sam Houston	741

* In this grand aggregate rifle and pistol match only four men finished the course.

DOCTOR McMANES TO CAPTAIN DEWAR TEAM

DR. M. E. McMANES, Piqua, Ohio, has been selected to captain the 1927 Dewar Team, succeeding Commander E. E. Wilson, who has been forced to resign the captaincy because of Navy Department business. Doctor McManes has come to be recognized as one of the most sincere and hardest working boosters for the .22-caliber game in this country, and his selection as team captain places at the head of the 1927 Dewar Team a man who has made his mark as a shooter, an organizer, and a worker. He has spared neither time, personal funds, nor energy to help make the small-bore game the leading sport in this country. The small-bore riflemen of the United States will rally to Doctor McManes as they would to only a few others. Under his leadership the 1927 team will do all that is humanly possible to bring the Dewar Cup back to America.

FRIEDRICH AND ALTMAN BROTHERS TIE FOR HONORS

FIRING a series of small bore matches at 100 yards, all positions, hardly ever results in a triple tie, all three competitors being ties for winning honors. In fact so seldom is it possible to get together three experts noted for consistent shooting in a triple match like this that we publish in detail the individual scores of each of these marksmen, A. K. Friedrich of Ames, Iowa and the well known Altman Brothers, Luverne.

50 Shots Standing, 100 Yards: Friedrich 438, John Altman 443.

50 Shots Prone, 100 Yards: Friedrich 480, Mike Altman 476.

20 Shots, each pos, 100 Yards: Friedrich 744, Nick Altman 744.

The tie in the four-positions match was shot off at 200 yards on the 200 yard International Target. Conditions, any rifle, any sights. Scores were: Nick Altman 658; Friedrich 675.

All of which would seem to indicate that the small-bore game, as has been rumored, is not in any way restricted to prone shooting.

SWISS-AMERICAN FATHER AND SON MATCH

IN FOLLOWING with the article appearing in THE AMERICAN RIFLEMAN last year regarding a "Father and Son Match," for any similiar affair in the service of any country, Lt. Col. Frank J. Schneller, Wisconsin National Guard, and his son, Sgt. Frank J. Schneller, also of the Guard, at Neenah, Wisconsin, have entered in to this competition with a Swiss Father and Son,—Commander Hans Hasler and Lieut. Hans Hasler, Jr., of Zurich, Switzerland.

The match will be fired on the competitors' home ranges, Tuesday Sept. 27, beginning at 2:00 p.m. Any rifle without alterations permitted, firing at 300 meters. Target to be used, 300 Meter 60 CM diameter, divided into ten circles. The course of fire will be: 10 shots slow fire prone, 10 shots slow fire kneeling, 10 shots offhand, 10 shots rapid prone, and 10 rapid kneeling. Possible score 500. The "spoils" are, to the winners, the Swiss Father and Son Trophy and diploma from the Swiss Schutzverein.

This announcement will naturally be of general interest to shooters in this country, if for no other reason than that the match is truly international. And the fact that the course of fire, taking the competitors through the three positions is similar to the Free Rifle International course, affords a splendid opportunity for the team representing our country to even the count. We offer the following slogan to the U. S. Two Man Team, and hope that Colonel and Sergeant Schneller will keep the same in mind: "Remember the Internationals at Rome."

ROBERTS ISLAND HELPS SELL PERRY TO STOCKTON CHIEF

A COMMITTEE from the Rifle Club will call on you some time within the next two weeks. Judge Rendon and I thought it would be appropriate to let you know the object of the visit so that you may be thinking the matter over in the meantime.

The Federal Government and the National Rifle Association are cooperating in a National Meet at Camp Perry, Ohio, to further rifle and pistol practice among our citizens. Delegates from all parts of the United States will make the trip next month.

Quite a large number of Stockton people have expressed the hope that ways and means might be provided for our police force to become more proficient in the use of pistols and revolvers. The members of the Roberts Island Rifle Club have suggested that we can accomplish such a purpose economically by sending a member of our Police Department to Camp Perry to receive instruction from the experts which the Government will have there.

The Committee is assemblying more definite information, but the present indications are that the expense to the City in that connection would only be between $250 and $300. Those who have investigated the proposition are very enthusiastic about it and are hoping that it will meet with your approval.

GEORGE B. WALLACE.

ARMY SHOTS NOSE OUT PIMA PISTOLEERS

IN A THRILLING return pistol match with the 25th Infantry of Nogales, the Pima Pistol Club again was defeated on the Tucson outdoor pistol range, the Army team getting the decision by the narrow margin of 21 points. The match consisted of ten man teams, the five high scores at each stage counting for record. The course of fire was: ten shots per man slow fire at 50 yards, 10 shots timed at 25 yards, and 10 shots rapid fire, 25 yards. Target used at the first and second stages was the official N. R. A. 50 Yard Standard American, while the Colt's Silhouette was used for rapid shooting.

(A Unit of the National Rifle Association devoted to teaching every boy and girl in America the safe and accurate handling of the rifle.)

Conducted by H. H. Goebel

New Plan of Interclub Matches

First Matches to be held week of September 19th

IT HAS always been a problem to arrange a program of matches to extend over a period of months that would meet with the complete approval of every instructor sponsoring a Junior Rifle Club. The newcomers and inexperienced teams had little chance of coming out on top when stacked up against clubs that had been shooting for years, while with the handicap plan by which teams set their own shooting "possibles," such as conducted last year, too much depended upon "luck," and as a result the majority of better shooting outfits suffered.

The program of Junior team matches for the 1927-28 season arranged from compiled comments and suggestions offered by the adult leaders of clubs thoroughly familiar with past programs should overcome many of these objections and place every club on an even basis. The simplicity of the rules and the equalizing of all competition should make this contest more popular than ever. The plan adopted is one of short periods of matches by classes according to team shooting strength with prizes at the close of each period.

The three periods of the gallery year are September 24 through December 17, January 7 through March 18, and April 1 through June 10. A match will be conducted every two weeks commencing with the week ending September 24. By conducting three periods of matches teams starting late have a chance to win at least one or two of the series of matches, while the early starters have three chances of winning throughout the year. The plan prevents a "dragging out" of any one match, and with divisions according to team shooting strength clubs which improve are enabled to move up and compete for more valuable prizes.

There are seven biweekly matches in the first period. The scores submitted by the five high men from each team in the first match for the week ending September 24 determines the classification or division in which teams belong. There are three divisions—A, B, C.

Division A will consist of the better shooting clubs. The ten high teams in each match receive points in multiples of 30 up to 300. (Winner 300, second 270, etc.) In the first period of seven matches it is possible to total 2,100 points.

Division B will consist of clubs less experienced. The ten high teams in each match receive points in multiples of 20 up to 200. In the seven matches it is possible to total 1,400 points. (Winner 200, second 180, etc.)

Division C will consist of newly organized clubs. The ten high teams in each match receive points in multiples of 10 up to 100. In the seven matches it is possible to total 700 points. (Winner 100, second 90, etc.)

This arrangement lends the needed encouragement for higher classification and rating as teams will be allowed to progress to higher divisions at any time during a period of matches, but at no time will a team be lowered after it has once been placed.

The second period of six biweekly matches gets under way with the week ending January 7, while the third period, also of six matches, starts with the week ending April 1. Teams will be reclassified for divisions with the first match in each period. Teams advancing from one division to another during the course of a period will carry over the points gained for placement in lower division matches. At the conclusion of each period of matches the high three teams in each division receive suitable prizes. At the completion of all three periods the three teams having the highest aggregate total of points will receive a special prize.

Ties occuring in any one period are decided first by the number of matches in which each team took part and secondly by the aggregate score in all matches for that particular period.

The targets for all seven matches in the first period of shooting will be mailed to the instructor in one mailing upon receipt of his team's entry. As there are ten men to a team, each man firing one target for record, it is required that all ten targets fired or unfired be returned for each match.

The final date for returns to National Headquarters for the match for the first period follow:

Matches Week ending—	*Returns due* Not later than—
September 24	September 29
October 8	October 13
October 22	October 27
November 5	November 12
November 19	November 25
December 3	December 8
December 17	December 22

CONDITIONS

Open to: Junior Rifle Clubs affiliated and in good standing with the N. R. A.

Teams: One or more teams of ten members may represent each club, but no one member may fire on more than one team.

Course: One stage, prone, 10 shots for record—two shots in each bull's-eye. Five high scores to count for team total.

Sighting shots: No sighters allowed on record targets. Sighting shots may be taken on practice targets before firing match.

Rifles: Any small-bore firing any .22-caliber rim-fire ammunition.

Sights: Metallic.

Targets: Official N. R. A. J. R. C. 5-bull (targets furnished).

When fired: At any time during the two-week period designated for each match. An entire stage must be completed the same day started.

Entries: Will be made by letter. No entry fee will be charged.

Returns: Ten targets for each match, fired or unfired, must be received at National Headquarters within five days after close of match.

Periods: Three periods of biweekly matches—September 24–December 17, January 7–March 18, April 1–June 10.

Classification: Teams classified in Divisions A, B and C by scores submitted in first match but allowed to advance at any time during a period. Division A teams compete for first ten places for points in multiples of 30 up to 300 in each match. Division B teams compete for first ten places for points in multiples of 20 up to 200. Division C teams compete for first ten places for points in multiples of 10 up to 100.

Prizes: Suitable prizes to the three high teams in each division at the close of each period. Special prizes to the three teams aggregating the highest number of points at the termination of the three periods.

Ties: Decided, first, by the number of matches in which a team took part; second, by the aggregate score in all matches participated during a period.

THE DAYS AHEAD

Make Plans Now For Your Fall Program

THE summer season of vacations is about over and we soon return to our homes, schools, churches, institutions and occupations. We have had a wonderful summer in camp, out of the city, on trips, at home, and now are full of the experiences that in the days to come will be more beneficial than at first anticipated. A certain amount of time and thought will be spent recounting and reviewing the many good times we have had.

However, we must always make the most of our time as this is a busy world, and we can not stop too long to look back but must look ahead to the future and prepare for what is yet to come. You have been successful in qualifying for several junior medal awards with the rifle, but there are higher honors to accomplish. You have found each step just a little harder than the preceding

one, but by conscientious practice and perseverence they were readily attained. The grades to come are still harder, just as they should be, for no qualification is worth anything unless constant effort is exercised. Do not become discouraged should you at first fail to make the grade but rather determine that you too can accomplish these individual honors which your fellow members have gained.

Since the inception of the Distinguished Rifleman bar to the individual qualification on January 1, 1924, exactly 55 members have submitted the necessay qualifications. During the past month five of our Experts have made the goal. Their names follow:

Angus Pauley, Porterville, Calif.
James Daley, Porterville, Calif.
Edward Ditzen, Davenport, Iowa.
Frank Brooks, Wichita, Kans.
Harry Manin, New York, N. Y.

You will never get any more out of a thing than you put into it. The individual medal decorations will hold your interest and keep you occupied, but it is competition with others in National Matches that makes the interest lasting and your advancement so much more rapid. Schools, churches, Y. M. C. A.'s, Boy Scout troops, and kindred institutions and organizations are today sponsoring the sport of rifle practice as never before. You will want a rifle club in your school, church, institution or club to which you belong. Do not say that you have no place to shoot. There is always space available somewhere and a little research work on your part will locate it. With your experience you can well realize that there ae but three essential requirements for the successful club: (a) a space 10 feet by 60 feet; (b) a safe backstop; (c) an adult who is interested to help carry on the work. Under the proper supervision and the full endorsement of the N. R. A. J. R. C. plan of instruction, including the individual and team matches, much enjoyment may be had.

This year a determined effort will be made to make rifle practice a major sport in schools. It is a great sport and your Corps is dependent upon you to say whether or not it will take its rightful place. The camps have already spoken, the schools are speaking louder each day and now the Y. M. C. A.'s and Boy Scouts are stepping into line. Will you do your part?

When your club is functioning smoothly, interest other local institutions and lay plans for a rifle league. Some of your intimate friends who are also interested in their marksmanship will be glad to help you. Take the intiative and start the ball rolling. National Headquarters will be glad to be of assistance wherever possible. There is always work to be done, but we are the ones to do it. We can not hope to fulfill our aims if we are to sit idly by waiting for the other fellow to prepare and arrange things for us.

This has been the greatest Junior Rifle Corps year in camps. We would like to tell you all about it but records are not complete at this writing. The October issue will give you this information with the results of the camp matches and the National Shoulder-to-Shoulder Matches at Camp Perry.

Let us make the N. R. A. J. R. C. a live issue in your town.

RIFLE PRACTICE POPULAR IN SUMMER CAMPS

THE camps are going great guns and with new camps taking on the activity for the first time, all previous records for individual accomplishments with the rifle will be shattered. At this writing there are exactly 191 boy and girl private camps throughout the country sponsoring the Junior Rifle Corps movement, and it is likely that this figure will well pass the 200 mark.

The wheels of progress are turning fast and the sport is gradually being accepted and taking its rightful place among the major activities. In these days of competition we are obliged to prepare and furnish what the demand calls for, and this also applies to the camps. The new arrangement of affiliation, awards on consignment, diplomas on consignment, returns by affidavit have lessened a vast amount of detail, thereby allowing the director or counselor in charge to devote more of his time to the necessities of camp.

It is the natural instinct of every American boy and girl to shoot the rifle, and it is they who have brought on the demand for the furtherance of the sport. We as the N. R. A. J. R. C. are helping to meet this demand and have taken it upon ourselves to teach every boy and girl in America how to safely and accurately handle the rifle, thus affording a highly specialized service for camps and all other kindred organizations and institutions.

The list of camps follows:

California.—Ilium, McCoy, Urban Summer Camp.

Colorado.—Burch, Cheley Colorado Camp, Crockett, Triple H Ranch.

Connecticut.—Kent, Pawnee, Po-Ne-Mah, Wonponset.

Florida.—Wewa.

Georgia.—Laurel Falls.

Indiana.—Bedford, Tecumseh.

Kansas.—Brown Memorial Camp, Hyde, Wood.

Maine.—Abena, Agawam, Androscoggin, Cobbossee, Damariscotta, Ha-Wa-Ya, Healthland, Highland Nature, Kennebec, Kewanhee, Kineo, Kineo Caddy, Koda, Mechano, Menatoma, Minnewawa, Mitigwa, Narragansett, Nokomis, O-At-Ka, Passagassawaukeag, Paysock, Powhatan, Rotherwood, Soan-Ge-Taha, Sokokis, The Barta Camp, Timanous, Wapello, White Moutain, Wigwam, Wildmere, Windsor Mt., Winnecook, Winona, Wyonee.

Maryland.—Matoaka, Tome, Rodney.

Massachusetts.—Fernway, Frank A. Day, Half Moon, Manning, Mashnee, Natick, Scout Camp, Norwich, Pomeroy, Wahtonah, Wampanoag, Wequaquet, Wickaboag.

Michigan.—Arbutus, Eberhart, Fairwood, Haley, Interlochen, Kairphree, Kee-Mo-Sah-Bee, Osoha-of-the-Dunes, Penn Loch, Storer.

Minnesota.—Wanaki.

Mississippi.—Henry Pratt.

Missouri.—Kickapoo.

New Hampshire.—Bay State, Boy Croft, Calumet, Carter, DeWitt, Greatlock, Idlewild, Kabeyun, Mishe-Mokwa, Moosilauke, Mohajo, Monadnock, Mowglis, Ogontz White Mountain, Old Homestead, Pinnacle, Samoset, Serrana, South Pond Cabins, Wentworth, Wingo, Winnemont, Wulamat.

New Jersey.—Arapho, Kiamesha, South Bergen Scout Camp, Washington.

New York.—Adirondack, Dudley, Dunes, Fire Place Lodge, Kirk Lake, Kyle, Lake Delaware Boys, Lake George, Lincoln, Nee-Ah-Gah-Neh, Oneida, Penn, Pine Bluff, St. Bernard's, Senape, Theodore Roosevelt, Ticonderoga, Tip, Tonde, Tunis Lake, Wakonda, Wamego, Woodland, Mohican.

North Carolina.—Black Bear, Carolina, Chickasaw, Chimney Rock, French Broad, Illahee, Junaluska for Boys, Junaluska for Girls, Keystone, Mishe-Mokwa, Mondamin, Osceola, Rockbrook, Sequoyah, Terra Alta, Toxaway.

Ohio.—Ro-Fre-La, Roosevelt.

Oklahoma.—Rogers Kemp.

Pennsylvania.—Mitchell-Harlee, Pine Tree, Pocono, Pocono Pines, Strongwolf, Wyomissing.

Tennessee.—Nakanawa, Webb, Whooppee.

Texas.—Crockett.

Vermont.—Abnaki, Duncan, Eagle Mountain, Glenbrooke, Kill Kare, Moosalamoo Wigwam, Maquam, Passumpsic, Sunrise, Teela-Wooket, Wihakowi, Wyoda.

Virginia.—Pocahontas, Shawanogi, Wallawhatoola.

Washington.—Arrow.

West Virginia.—Alleghany, Greenbrier, Terra Alta.

Wisconsin.—Casady, Court Oreilles, Highlands, Indianola, Minne-Wonka, Minne-Wonka Lodge, Stonehill, Strongheart.

Canada.—Bonaventure.

HAAREN HIGH SCHOOL RIFLE CLUB WELL SUPPORTED

DURING the past school year the Haaren High School, with the untiring co-operation of Instructor L. C. Williams, very successfully promoted the Junior sport of rifle-shooting among its members. With the enthusiastic support of Mr. Roland Patterson and Mr. Burnham, principal of the school, the range was built and opened for use in November. This range was fully equipped, giving every pupil an opportunity to learn the use and care of the rifle and to become proficient in marksmanship. To date the Club has a membership of 251 students, while a total of 127 awards were presented during the school season. Extracts quoted below have been taken from a bulletin of accomplishments of the Haaren High School:

"To the casual observer, rifle work seems a pleasant diversion, involving a large amount of luck and serving to interest pupils in extra-curricular activities. But to one familiar with the sport, its educational value puts it into the first rank. The immediate benefits to the participant are a wholesome respect for the dangerous nature of the rifle and a careful adherence to the rules for its safe use. It teaches accuracy, patience, persever-

(Continued on Page 43)

New Instruction Manual for Juniors

By Captain Walter G. Layman

(Continued from August)

CHAPTER VII

Sight Adjustment

Before any sight adjustment is attempted you must pass the "Group Test": that is, place five or more shots very close together. It is necessary at this time, however, to explain the manner of adjusting the sights on your rifle.

The best rifles of today have a fixed front sight and an adjustable rear sight. The rear sight is so graduated that by turning a thumbscrew it can be moved up, down, right, or left, as the case may be. To lower the strike of your shot group, lower your rear sight; to raise the shot group, raise your rear sight. If you wish to move the shots to the left, move your rear sight to the left; and to move the shots to the right, move your rear sight to the right. You should be careful to note the exact adjustment you use for the different distances and, after that, before starting to fire at a particular range, to set your sights for the correct range.

The less expensive rifles do not have the adjustable rear sight, and it is necessary to adjust them in the following manner: The front sight should be centered in the middle of the barrel and left there. All adjusting should then be done by moving the rear sight. If you find in shooting your shot group is high, the rear sight must be lowered; and if the group is low, the rear sight must be raised. It is necessary to do this adjusting a little at a time, with a screwdriver. To move the shot group to the right or left, place a small piece of leather or wood against the side and with a small hammer tap it gently in the direction you wish to move the shot group.

Some rifles are equipped with an aperture front sight. When using a sight of this kind you simply have it encircle the bull's-eye.

The peepsight should always be used in preference to the open sight, as it is a distinct advantage at all times.

Sight-Adjustment Test

Q. What effect does moving your rear sight have on your shot?

A. It moves in the same direction as the rear sight moves.

Q. If you want to make your shot strike higher, what do you do?

A. I raise my rear sight.

Q. If you want to make your shot hit more to the right, what do you do?

A. I move my rear sight to the right.

Q. Before making any sight correction, what must you have?

A. A shot group.

Q. What is meant by a "shot group"?

A. Five or more shots very close together.

Q. Why is it necessary to have a shot group before making any adjustment in the sights?

A. Because if I have a shot group I am certain that I am aiming and squeezing the trigger properly, and it is simply a mechanical operation to move the sights so the group will be placed in the bull's-eye.

CHAPTER VIII

Range Practice

Ranges

Each club should provide a suitable range on which instruction practice, qualification firing, and all kinds of matches can be held. Both indoor and outdoor ranges may be used.

Instruction Firing

All firing will be supervised by an instructor or a competent adult. You should not ask, or be permitted, to fire until you have satisfactorily passed all the tests in the preparatory exercises and learned the code. It is especially important that you understand and practice correct trigger-squeeze. Remember, almost any one can aim and hold well enough to make a creditable score. The poor scores are nearly always due to pressing the trigger incorrectly. Instruction firing is always started in the prone position, and no attempt should be made to fire in the other positions until you have mastered the trigger-squeeze. The instructor must strictly enforce all safety precautions while on the range.

Group Test

Before making any change in your sight setting, after you start firing, you must pass the "Group Test." This test consists of placing five or more shots on the target in such a position they can be called a group; the diameter of this group should not be greater than 3 inches for beginners. The group may be some distance from the bull's-eye—high, low, right, or left—but if they are grouped, you have demonstrated your ability to squeeze the trigger and are permitted to make the mechanical correction, with your sights, to bring the group to the bull's-eye. If the shots are scattered you are not squeezing the trigger and you will not be permitted to make any change in your sight setting until you can group your shots.

Coaching

Each member, during instruction firing, must have a coach to watch him and help correct his errors, the same as in the preparatory exercises. It is not necessary to have an old, experienced shot as a coach. Any intelligent corps member who has passed the tests should be competent to act as coach. The coach must take the same position as the man firing, so as to watch his trigger finger and his eye. The coach checks the following points:

(1) That the ammunition is free from dirt.
(2) That the gun-sling is properly adjusted.
(3) That the correct position is assumed.
(4) That the slack on the trigger is taken up promptly.
(5) That the breath is held while aiming.
(6) That the shot is called.
(7) That the sights are not changed until the "Group Test" is passed.
(8) That the rifle is unloaded and the bolt left open before the firer leaves the firing-point.

Errors in trigger-squeeze, which are the most serious and the hardest to correct, can be detected by watching the firer's eye. If his

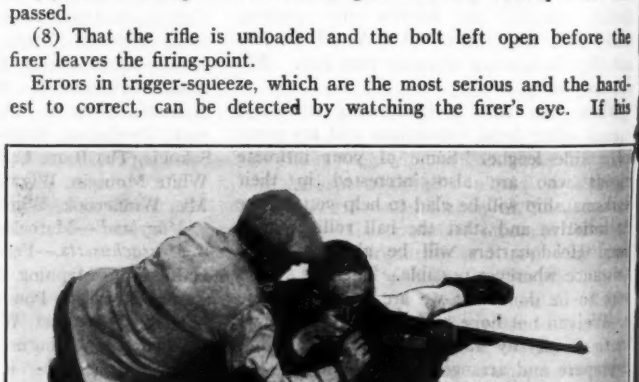


Plate 12—Coach Squeezing the Trigger

eye can be seen to close as the rifle goes off, it is because he knew when it was going off and consequently was not squeezing the trigger properly.

You can always prove to a firer that he will make a good score as soon as he learns to squeeze the trigger properly by having the coach squeeze the trigger while the firer holds and aims the rifle. To squeeze the trigger for the firer, the coach lies with his right elbow on the ground to steady his hand, places his first finger against the trigger and his thumb against the back of the trigger guard. In this way he can apply pressure by a pinching action of his thumb and first finger.

The coach then watches the firer's back and, between 5 and 10 seconds after the firer begins to hold his breath, he applies on enough pressure to discharge the piece. Shots fired in this way are almost always accurately placed. Try this out.

Remember, good shooting is a matter of instruction and not of mere practice. If you will follow the procedure outlined in this Manual and practice the exercises you will do good shooting from the very beginning of your firing. Attempting to fire without proper instruction will result in disappointment for you because your shooting will be poor, and simply because you do not understand, and have not practiced, the few mechanical operations necessary for good shooting. Whenever you are in doubt, refer to the Manual.

CHAPTER IX

Organization

Membership

Any boy or girl of good character who has not reached his or her nineteenth birthday and agrees to abide by the rules of the N. R. A. J. R. C. is eligible for membership.

Registration

An individual registration fee of twenty-five cents is charged, which helps to cover the cost of mailing the N. R. A. J. R. C. *News* to all members of the Corps who qualify as Marksman. Membership applications may be obtained from National Headquarters. A membership card and button, which should be worn at all times to show your affiliation with a National Organization, and Rule Book giving the complete program of individual qualifications and matches is mailed to all applicants. Every member will be expected to re-register before the first of each year. Registration fees submitted during the months of November and December will be credited toward the following year.

HAAREN HIGH SCHOOL RIFLE CLUB WELL SUPPORTED

(Continued from Page 41)

ance and self-control, as well as courtesy and consideration for team mates and adversaries. Many a boy or girl who, through some physical handicp, is precluded from more strenuous activities, finds in rifle practice an opportunity to compete on even terms with his more fortunate fellow students.

"Two objections suggest themselves: one that rifle practice is not a social game, and the other that it smacks of militarism. The first is just criticism; but we believe that in our long list of games, most of which lend themselves to noise and enthusiasm, there is a place for a quiet, intensive sport. As for the war-like phase of shooting, in all our experience this has never manifested itself. The training which made such heroes as York and Woodfill will never want for supporters."

* * *

Congratulations are extended to one of our Junior Riflemen, Karl Friedrich, of Ames, Iowa! Karl, who is but 12 years of age, recently entered the 50-yard Tyro Match and came out in seventh place with a score of 393 x 400. This match, which was open to tyros from all parts of the country, was conducted in four stages in the prone position, with many widely experienced shooters as contestants. In a match during the same week with Dayton, Karl took third honors, which proves his ability to master the rifle. This is a great incentive for our many other affiliated members.

* * *

The Junior Rifle Club, of Cincinnati, Ohio, is walking away with the individual qualifications and honors. Instructor M. F. Eder, who is in charge of this live group, has to date submitted individual qualifications for 40 Pro-Marksman awards, 20 Marksman, 14 Sharpshooter and 32 bars, in addition to qualifying three of his members as Expert Rifleman. All of these members have received medal decorations, while several have requested the pin awards.

EXPERT RIFLEMAN

IF YOU were at National Headquarters and could see the targets coming in each day you would think that the various clubs, camps and individuals were having a spirited contest to see which could send in the most targets.

The returns have been coming in fast, keeping the medal department extremely busy issuing awards and diplomas. The month promises to be a record breaker in total awards issued. Among these many qualifications are eighteen for the Expert Rifleman medal, qualified for in four positions. These members are now competing for the highest individual honors of the Corps—Distinguished Rifleman:

David McDougal, Washington, D. C.
Richard Drever, Arlington, N. J.
Adair Comstock, Porterville, Calif.
Joseph Cascone, Brooklyn, N. Y.
Charles Brownell, Brooklyn, N. Y.
Norman DePool, Brooklyn, N. Y.
John Logan, Culver, Ind.
Henry Clifford, Pottstown, Pa.
Walter Erickson, Chicago, Ill.
George Johnson, Malden, Mass.
Richard Rich, Malden, Mass.
Henry Kiley, Malden, Mass.
Clarence Trittle, Pottstown, Pa.
Vernon Diehl, St. Louis, Mo.
Joseph Dergath, Detroit, Mich.
Harry Manin, New York City.
Donald Snyder, South Bend, Ind.
William Smith, Erie, Pa.

* * *

Instructor George L. Wood, who is sponsoring Units One and Two of the Glendale Junior Rifle Corps, is fast acquainting his members with the many individual qualifications offered by National Headquarters. Several qualifications have already been submitted for the first grade—that of Pro-Marksman—and we expect more in the near future.

Recently a Novelty Match was conducted between these groups at their club range. Ten shots were fired by each participant for record, in which Raymond Jameson of Unit One tied with Harold Kost of Unit Two. This tie was overcome by Rifleman Jameson winning first place, while Harold Kost came in a close second.

Instructor Wood is now working toward oganizing the Kirkwood Juniors, and within a short time Headquarters will have the pleasure of chartering a third Unit of the Corps.

* * *

The Junior Rifle Club, of Moline, Ill., under the instruction of H. B. Cole, has shown great increase in activity and interest. New memberships are gradually being submitted to National Headquarters and several of the boys have already qualified and obtained medal awards which has created much enthusiasm. The instruction has also made it possible for these members to qualify for their Scout Marksmanship Merit Badge, which Instructor Cole advises very few of them have been able to do before.

Through the co-operation of the Local Scout Executive a rifle range is being constructed for the private use of these members.

* * *

The Texas Optometric Association only recently staged a successful shoulder-to-shoulder team shoot for the Boy Scout Troops featuring rifle shooting. Because of the large number of entries it was found necessary to limit the number of competitors per team to three.

High honors in the shoot were carried off by Troop 8, of the Denver Boulevard Methodist Church. The winning team having an aggregate score of 241 carried off the cup offered by the Association. Troop 19, sponsored by the Elk Clubs, came in second with 224, while Troop 23, of Fort Sam Houston, was third with 217. Capt. R. C. Murphy is Scoutmaster of this troop, which only recently affiliated with the N. R. A. Junior Rifle Corps.

The individual scores of the Fort Sam Houston shots were as follows: S. Weld 70, W. Connor 69, R. Murphy 78.

Conducted by Lieut.- Col. G. C. Shaw

NO MORE CUT-OFF KRAGS

WORD has been received from Benicia Arsenal that the supply of Krag rifles at that point has become exhausted. Therefore, the sale of Krag rifles cut off to carbine length and sold for $3.50 must be discontinued. N. R. A. members on the Pacific coast are also advised that the nearest point from which regular Krag rifles may be shipped is Rock Island Arsenal, Ill. If another supply of cut-off Krags becomes available, notice will appear in this column. It is not likely that another supply will become available for some time, if ever. A large stock of the regular Krag rifles remains available, at the current price of $1.50 each.

QUALIFICATION BADGES FOR CIVILIANS AT CAMP PERRY

ATTENTION of all civilians attending Camp Perry is invited to paragraphs 36 and 44, Bulletin No. 2, W. D., March 28, 1927, regarding issues of qualification insignia at the National Matches. These paragraphs read as follows:

"36. An appropriate badge representing qualification in the Regular Army course will be issued to all civilians who qualify as expert rifleman, sharpshooter, or marksman in the national individual rifle match. Qualifying scores: Expert rifleman, 255; sharpshooter, 230; marksman, 210.

"Members of the Reserve Officers' Training Corps and Citizens' Military Training Camps will obtain their insignia through their respective corps area headquarters. Other civilians will obtain their insignia from the Director of Civilian Marksmanship.

"44. An appropriate badge representing qualification in the Regular Army course will be issued to all civilians who qualify as pistol expert, pistol sharpshooter or pistol marksman in the National Individual Pistol Match. Qualifying scores: Pistol expert, 240; pistol sharpshooter, 225; pistol marksman, 210. Members of the Reserve Officers' Training Corps and Citizens' Military Training Camps will obtain their insignia through their respective corps area headquarters. Other civilians will obtain their insignia from the Director of Civilian Marksmanship."

Those civilians authorized by these paragraphs to obtain this insignia from the D. C. M. may obtain the same at Camp Perry by calling at the D. C. M. office as soon as the bulletins of the National Individual Rifle Match and National Individual Pistol Match are published.

SENDING IN QUALIFICATION REPORTS

SOME club secretaries have been sending in the qualification report just as soon as one or two or perhaps a half dozen of the members of his club qualify. This is not necessary or desirable, for whenever a badge is issued to a shooter, he will be unable to get a badge for a higher qualification the same year. It may be all right to send in your Experts, for they can not get a higher badge anyhow, but you should keep after your Marksmen and Sharpshooters and try to get them to fire again, several times if necessary, so that they can qualify for a higher badge. At the end of your outdoor firing season get together your scores and send in the best scores. Insignia will be issued as soon as possible. Please do not wait to send in the qualification reports until the time that you send in your annual return. The office is always busy on the returns at that time and the issue of badges is delayed somewhat.

PLENTY SPORTERS AND M-1 RIFLES READY

AT THE present time there is a good supply of Sporters and Caliber .22, Model 1922 M-1 rifles available. Now is the time to order one so that you will have it on hand when you want it. A small supply of these two very excellent rifles will be on hand at Camp Perry, so that shooters who wish may purchase their rifles there. Call at the D. C. M. office for further information. The price of these rifles remains the same, $49.50 for the Sporter and $46 for the M-1. Packing charges, $1.34 on each one.

SHIPPING TICKETS

CLUB secretaries are again requested to be prompt in sending in signed shipping tickets for the supplies just as soon as the supplies are received. Do not delay in sending them in. These papers are very necessary, so that this office may have a complete record of the property held by the club. Whenever a shipping ticket is not received here promptly, this office has to write to the club secretary asking him for it. In case he again overlooks it, then another letter has to be written. Sometimes the second request gets action, but if not, this office will then take steps to have all the government property previously issued to the club returned to an arsenal. In other words, close out the club. Many clubs are on the waiting list at the present time that will be glad to take the place of clubs that do not comply with regulations. It is suggested that club presidents interest themselves in this matter, so as to see how well the secretary is carrying out his duties. Sometimes things are going badly and the members of the club and the other officers know absolutely nothing about it until they hear suddenly that the D. C. M. has called in the supplies. They then write explaining matters, and the file of the club shows that the D. C. M. has tried repeatedly to get replies to letters with no results. Send in tickets promptly.

TRAINING REGULATIONS

RIFLE Marksmanship, Training Regulations 150-5 (10 cents) and Training Regulations 150-10 (5 cents) and the Individual Scorebook (15 cents) may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. Do not send stamps. It is recommended that each rifle club member purchase these publications. Careful following of the principles explained in these pamphlets will help a shooter become better.

CLEANING AND DECAPPING TOOLS

A SMALL number of sets of cleaning and decapping tools for caliber-.30, caliber-.38, and caliber-.45 cartridges still remain available. These sets have been used but are serviceable and are sold for $1.50 per set. Anyone desiring to purchase a set of decapping and cleaning tools for the aforementioned cartridges could hardly go wrong buying one of these sets for $1.50.

NO PACKING CHARGES ON OBSOLETE RIFLES

EVERY once in awhile some N. R. A. member will include packing charges when ordering obsolete rifles such as Krags, Russians, etc., which has to be returned to him. It is unnecessary to send in packing charges on obsolete rifles. Whenever anyone sends in such charges it is obvious that he has failed to read his Price List carefully, because it is noted under the title "Obsolete Arms"—"No Packing Charges on Obsolete Arms." The moral of this little yelp is "Read your Price List, and then follow instructions."

NO NATIONAL MATCH AMMUNITION AVAILABLE

PLEASE do not try to order National Match ammunition. There is none of it available for sale. The new pistol ammunition, $70.80 per case of 2,000 rounds, is very good for any pistol shooting. The new service ammunition, caliber-.30, M-1, $59.48 per case of 1,200 rounds, is practically the same as the 1925 National Match ammunition, being machine instead of hand loaded.

Trade News

THE NEW BELDING & MULL SPORTER

THE host of riflemen who have been interested in obtaining a properly stocked and completely equipped sporting-rifle without paying from twice to five times the original cost of the gun, are at last having their wish granted.

The new Belding & Mull Sporter, consisting of the Remington Model .30 Express rifle and special stock designed by Col. Townsend Whelen, a plain but fully outfitted rifle for the practical hunter, is now available to all sportsmen who have not cared to pay a high price for a custom-built gun.

The Whelen stock of plain American walnut is designed to make good on every shortcoming of the usual factory stock. The forestock is long enough, full hand-filling and adequately checkered. The butt-stock is made full man's size with a real shotgun butt-plate, properly placed pistol-grip and full-formed comb made as high as the withdrawal of the bolt will permit.

Belding & Mull have added handwork on the action for extra smoothness, and on the stock for extra finish. Other refinements included are: special sling-eyes and detachable snap-swivels and sling. Each Sporter is also equipped with a Watson gold bead front sight of the correct height required by the rear sight selected. There is no other barrel sight provided for.

By getting out a lot of these Sporters in one standard grade the cost has been cut to a nominal figure, permitting an unexpectedly low selling price.

NEW PUMP-GUN OF STEVENS ARMS CO. NAMED FOR FAMED INVENTOR

JOHN M. BROWNING, one of the world's outstanding figures in developing breech-loading and auto-loading rifles, shotguns and other arms, is dead. But it is easy to foresee from the trend of present-day events that his name more and more will become a household word where firearms are spoken of.

The J. Stevens Arms Co., of Chicopee Falls, Mass., has just produced a new hammerless repeating shotgun embodying a number of the Browning improvements controlled by this company. This gun—a very fine piece of workmanship—has fittingly been named the "Stevens-Browning" shotgun. This name was not arbitrarily affixed to the new firearm by the manufacturer. It was selected by a board of judges from a huge list of names suggested by hosts of hunters, sportsmen and lovers of the outdoors. The suggestions were sent in answer to the recent "Name Contest" conducted by the Stevens Company.

The new Stevens-Browning gun fills a necessary place in the hammerless repeating shotgun field. It is made in 12-gauge; barrel from 28 to 32 inches in modified or full choke.

The original design of this hammerless gun was worked out by Browning himself. Its action is unusually smooth, because the sliding breech travels in a straight line, eliminating the usual sloping curve. Safety in the takedown mechanism is assured by the method in which this feature screws up tight each time it is assembled. It can not shoot loose.

An independent safety, a safety firing-pin, visible locking-bolt and side ejection are some of the features of this new gun. Slide handle and stock are of checkered walnut. Receiver is drop-forged; breech is solid. Five shots are carried in the magazine; any standard factory-loaded shell up to 2¾ inches is usable.

The trade already has given the new Stevens-Browning an enthusiastic reception, and there is every surety that this arm will take an important place in the shotgun world. It is a good looking piece, balanced well, and has the comfortable "feel" of a fine arm. In every part the utmost of Stevens experience has been devoted to the new shotgun.

WATSON SIGHTS NOW MADE IN U. S.

THE former Watson Gunsight Co. of Toronto, Canada, makers of the unique line of Watson Sights, has been absorbed by Belding & Mull, Inc., of Philipsburg, Pa.; and the machinery has been moved across the Canadian border and installed in the new wing of the Belding & Mull Telescope Sight and Shooting Accessories Plant at Philipsburg, Pa. This step has been taken to insure prompt delivery of these popular sights. In taking over the United States agency for Watson Sights two years ago, Belding & Mull encountered an unexpected interest among American sportsmen, so great that the Toronto Plant was not able to supply the demand.

United States shooters will be interested to learn that these sights are now being manufactured in quantity in this country, and under direct supervision of Mr. M. J. M. Watson himself. As fast as a satisfactory stock of each model has been accumulated it will be announced in this magazine. The first item on the schedule is now ready and is advertised in this issue.

F. F. HICKEY MADE GENERAL MANAGER SAVAGE ARMS CORPORATION

ANNOUNCEMENT is made of the appointment of Mr. F. F. Hickey to the position of general manager of the Savage Arms Corporation, owners and operators of J. Stevens Arms. His headquarters will be in Utica, N. Y.

The appointment is in recognition of Mr. Hickey's long and faithful services in the Savage and J. Stevens Arms organization. Many years ago Mr. Hickey began his business career in the Stevens plant. Steadily he climbed the ladder until he was vice president of that subsidiary of the corporation. His next appointment was assistant to Mr. F. R. Phillips, vice president and general manager. Mr. Hickey is well known in the arms and electrical appliance fields.

NEW LYMAN SIGHT FOR 7.62 RUSSIAN

IN OFFERING to members of the National Rifle Association the opportunity to purchase the Russian 7.62-mm. rifle, the Director of Civilian Marksmanship makes it possible for shooters to obtain a well-made powerful bolt-action rifle for a negligible sum. The price at which the Government is disposing of this surplus war material has no relation to the true value of the same. That the Russian 7.62 mm. needs remodeling to be of the greatest practical use to the hunter is evident after a glance at the gun; but it is possible to do this work without elaborate tools or experience and obtain satisfactory results.

The length of barrel of the Russian rifle as issued is about 31 inches. This is an unwieldy length for any gun; but it is not a difficult matter for any one with a hack saw to shorten this barrel. With the barrel cut to a length of 23 inches a Springfield front sight assembly can be used. Members of the National Rifle Association can get this from the Director of Civilian Marksmanship, or the Lyman Gun Sight Corporation, Middlefield, Conn., can supply the assembly complete, with either an ivory or gold bead front sight, for a couple of dollars.

By especially adapting and redesigning their No. 36 Receiver Sight, which has been successfully used for years on Mannlicher-Schoenauer and Mannlicher-Haenel rifles, the Lyman Corporation have now this sight available for the Russian 7.62 mm. It is designed to be attached to the left-hand side of the receiver; and the sighting aperture, which has the well-known Lyman built-in turn-down peep, is pivoted on a horizontal arm that allows the bolt to function freely when loading. The aperture of this sight is brought conveniently close to the eye, and 9 inches nearer the eye than the Russian factory rear sight. The No. 36 sight can, of course, be used on the rifle "as issued," and then gives a distance between sights of 35 inches. When the barrel is cut to 23 inches the distance between sights is 29 inches, or 3 inches greater than is the case on the gun as issued.

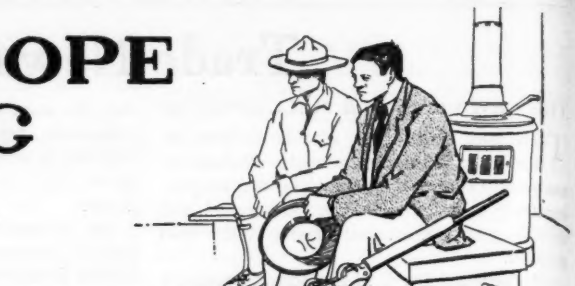
Moreover, while the original Russian rear sight has no adjustment for windage, the Lyman No. 36 sight is adjustable both vertically and horizontally. To attach No. 36 sight only two mounting screw holes must be drilled in the receiver, and individuals can do this themselves if they order a tap and drill or any mechanic can do it.

BALLISTIC INFORMATION FREE

THE Hercules Powder Co. has published a new 30-page sporting powder booklet which describes each of their rifle, pistol, and shotgun powders, including Herco, the new heavy-load shotgun powder. New loads for the Springfield, Krag, .45 Colt Automatic, .38 S. & W. Special, etc., are included, as well as very complete tables of muzzle velocities and pressures.

The booklet may be obtained free by writing to the Advertising Department, Hercules Powder Co., Wilmington, Del.

THE DOPE BAG



A Free Service to Target, Big Game and Field Shots—All questions answered directly by mail

Rifles and Big Game Hunting: Lt.-Col. Townsend Whelen **Pistols and Revolvers: Major J. S. Hatcher**

Shotgun and Field Shooting: Captain Charles Askins

Every Care is used in collecting data for questions submitted, but no responsibility is assumed for any accidents which may occur.

Three-barrel Guns

By Capt. Chas. Askins

I SEEM to have raised a considerable, unexpected disturbance by writing some man in Pennsylvania that three-barrel guns were not made in America, but would have to be imported. I know they have to be imported now, and largely who is importing them; so here goes.

Various importers have written me, some of them the least bit peppery because I didn't know and didn't state that they had such weapons for sale. If these gentlemen had placed a display ad in The American Rifleman, I'd been sure to have known it, you see. Certain other private owners of three-barrel guns are willing to sell them, also, provided I called the attention of the would-be purchaser. I shouldn't mind, but our editor might, and very possibly our advertising manager might ask where he came in.

As I suspect, all the three-barrel guns to which my attention has been drawn are made in Germany, though some of this type of gun are also made in Belgium. Three-barrel guns fit in well with European shooting, which might include roe-deer as well as small game.

Now let me go on record with the statement that, "being made in Germany" is not to be considered as a criticism of a three-barrel gun or any other gun. In one respect German-made guns are markedly superior to those made in any other country. I believe that German engraving is unrivaled, and the three-barrel arms, to which my attention has been called, are very handsome weapons. Moreover, your German manufacturer has more ingenuity in adapting means to an end than any other gunmaker, so far as I know. I once ordered a German three-barreled gun, and it came with every dog-gone thing I asked for, though the specifications for that gun were probably different from anything that had ever been seen before. The rifle-cartridge was a 25/40/117, based on the Krag case. The three barrels were pulled with two triggers, with the trigger-shift on top of the tang. It had Greener safety, and it had a detachable scope-sight of such wide field that it could be used in wing-shooting. Everything possible in the way of finely finished wood and engraving was put on that gun. It was a beautiful weapon—nothing short of that. Just that sort of gun can be obtained in Germany today, at less cost than in any other country whatever.

Now then, let's get down to business, unless the editor stops me. It is all up to him now.

A. F. Stoeger, Inc., 224 East 42d Street, New York City, says he has the largest stock of imported firearms in the United States and that he specializes in three-barrel guns. Mr. Stoeger says that he has four guns in stock that are just about what I recommended—16-gauge; weight, 7½ pounds; 25/35 or 30/30 rifle-barrel; 28 inches long. He also has 12-gauge shot-barrels and 25/35 rifle; additionally, similar guns in 20-bore. Mr. Stoeger further advises that he advertises with us sometimes. In that case the West Virginia man, or the Pennsylvania man, whichever it was, should have seen the advertisement and not troubled me. Stoeger's catalogue will be sent on request.

Another German manufacturer has taken advantage of my suddenly acquired notoriety by advising me that he makes extraordinary 280 rifles. This is Halger & Gerlich, Hamburg, Germany. This 280 rifle has a muzzle velocity of 3,800 foot-seconds with 100-grain bullet; energy 3,150 pounds; 145-grain bullet, B. T., velocity 3,350 feet, energy 3,550 pounds; 175-grain bullet, velocity at muzzle 2,900 feet, energy 3,375 pounds. Remaining velocity at 300 meters 2.550 feet, with remaining energy of 2,600 foot-pounds. Accuracy is shown to be equal to a half-inch ring at 110 yards. Pressures are said to be normal; rifle weighs 7 pounds 9 ounces; double set or single-trigger, scope or open sights. That kind of rifle will make our fellows step some.

Sloan's Sporting Goods Co., 88 Chambers Street, New York City, writes me that they have a complete line of three-barrel guns, at prices from $150 to $195. They are handsome arms, judging by the cuts. Sloans also have double guns, over-and-under, at prices that can not be met in American arms in this style. In fact, their over-and-under guns cost no more than ordinary double shotguns as made in this country or England in like grades. These lads won't advertise, so I have to tell it, for the sake of our readers.

Baker & Kimball, 38 South Street, Boston, Mass., haven't written me about their three-barrel guns, but they keep such arms and probably would write me later if I failed to mention them. I judge their guns are made by J. P. Sauer & Sons, among the best of German gunmakers.

A couple of private owners of three-barrel guns have also written, stating their arms are for sale and the price. Unfortunately I do not keep a file of correspondents, which is done at the office of The American Rifleman. Therefore I no longer have the addresses of these people.

This settles me. I have done all that I can to bring the salesman and the purchaser together. The rest is up to the advertising department.

ADJUSTING THE TRIGGER PULL ON THE REMINGTON MODEL 30 EXPRESS RIFLE

I HAVE recently bought me a .30-'06 Remington bolt-action rifle. I like this rifle fine, except the stock and the trigger. I suppose I shall have to have a stock made to fit mine with a higher comb and a new and larger butt-plate of shotgun shape with a trap, but I want to ask you about how I shall adjust this trigger to give a good pull. Remington has done away with almost all of the slack in this trigger, but evidently they could not do away with all of it and let the trigger still be safe, and so there is just a little remaining, and when you squeeze the trigger this remaining slack feels just like a very bad creep, and I can't hit anything with the trigger this way, especially when I try to fire quickly. Please tell me what I can do to make this trigger like that on my National Match Springfield.—D. M. G.

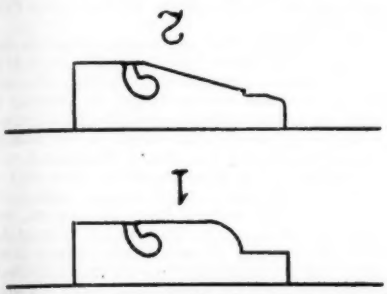
Answer (by Colonel Whelen). The trigger on the Remington Model 30 rifle is most unfortunate. I believe that they should have adhered to the original bolt-action trigger, like that on the U. S. Model 1917 rifle and the Springfield rifle. I do not think that it is possible to do much with the present sear on your Remington. Presuming that you are a member of the N. R. A. you should write to the Director of Civilian Marksmanship, War Department, Washington, D. C., give him your N. R. A. number, and tell him that you wish to purchase for your own use and not for resale the following parts for the U. S. rifle, Model of 1917, caliber .30:

	Cents
Trigger	30
Sear	47
Trigger-pin	01
Sear-spring	04
Total	82

Inclose post-office money order to his order for 82 cents and also 10 cents in stamps for mailing, and request that he mail these parts to you. When you get them assemble them

into the rifle in place of the similar parts. You will probably find that the slack or preliminary pull is now all right, but there is still a little drag or creep in the final pull. Take the sear out and polish the bluing off of the front and rear upper surfaces of the sear and try it again. If this does not correct the drag in the final pull, then start and grind down gradually on the top surface of the edge of the sear, using a fine oil-stone and grinding down squarely and evenly. Assemble the sear and try the pull from time to time until it is just right with none of the drag or creep remaining in the final pull. In the book "Amateur Gunsmithing," you will find a whole chapter on adjusting the trigger pull, and this chapter will tell you exactly how to do this.

While you are doing this you will probably find that it is very difficult to lift the bolt-handle and cock the rifle with this new sear in place. This is because the rear portion of the cocking-nose on the bolt comes against the front inclined surface of the sear during the cocking or bolt-opening operation, and considerable force is necessary to make the cocking-nose come to the rear against the force of the sear and sear-spring. The remedy for this is easy. You will notice that the nose on the cocking-piece is shaped like cut No. 1, and you simply grind the rear



of this nose down with the oil-stone and polish it well into the inclined shape shown in cut No. 2. I have myself remodeled the trigger pulls on a number of Remington Model 30 rifles in this way, and in every case have been able to get a fine trigger pull just like that on our National Match Springfields.

Incidentally, I understand that Belding & Mull have made arrangements with the Remington Arms Co. to manufacture for them exclusively a new and excellently shaped factory stock for the Remington Model 30 rifle. The stock will probably be available through Belding & Mull about August.

REAR SIGHT ON .303 ROSS

I HAVE just bought a .303 Ross British army rifle and find that I do not understand the rear sight; especially raising and lowering. Is it possible to get muzzle-loader caps, and where? I would like to get the complete dope on this.—S. M.

Answer (by Colonel Whelen). I have your letter of July 3. The scale on the right side of the leaf of the Ross rifle-sight is for yards. That on the left is a vernier scale reading to minutes of angle; that is, the smallest vernier graduation on this scale is a minute of angle and will cause a change of impact of 1 inch at 100 yards, 2 inches at 200 yards, 5 inches at 500 yards, and so on. The index lines for the yard-scale are to the right of the square opening on the slide. The upper index line, marked with an arrow, is for the open sight, and the lower one, marked with a circle, is for the peep. The button on the left side of the slide is a quick release for the slide. Push this in and the slide can be run up and down quickly by hand and set roughly. Then accurate adjustment is made for elevation by means of the knurled screw at the top of the leaf.

The windgauge is graduated in points and half points. A change of a half point changes the point of impact 5 inches at 100 yards, and a change of a full point changes it 10 inches. The windgauge-screw on the right side of the slide in addition has clicks for minutes of angle. One click gives one minute or 1/10th point, or 1 inch at 100 yards, 2 inches at 200 yards, and so on.

The open sight which appears in aiming position when the leaf is laid flat is the battle sight. I do not know the exact range for which this is theoretically adjusted. Probably it is 200 yards, but you will have to find out by experimental firing just at what range this sight is correct for you individually. The same applies to all other adjustments on the rear sight. You can not tell until you have fired the rifle just where the sight must be adjusted to shoot correctly for you at a given range. For example, if you wish to shoot at 500 yards you may find that it is necessary to set the sight for elevation at 400, 500, or 600 yards, or at any point in between. This is true with all rifles.

Caps for muzzle-loading guns are made by most of our cartridge companies. Any sporting-goods store can obtain them for you on special order. There are two sizes. If not certain what size you require, measure the diameter of the nipple of your gun and have the store send this dimension in with the order and the factory will send the right size caps.

HUNTING IN WYOMING

I HAVE been considering a two or three weeks hunt in Wyoming, with a friend. As this would be our first try for large game we need much advice as to place, equipment, etc.

Where in Wyoming would we have the best chance for a few shots at deer and elk, especially the latter? Would some place nearer be as good or better? Would it be necessary for us to have a guide, if so, how would you suggest we get one? What other main items of equipment will we need?

As to rifles, how about a Krag with 25-inch barrel, the wood forearm flush with the muzzle, and equipped with Lyman No. 34 receiver sight and gold bead front?

If the points of the new D. C. M. 30/40 cartridges were filed so as to expose the lead would they be suitable for game?—W. T. P.

Answer (by Colonel Whelen). I have your letter of July 5. The best hunting country in Wyoming for elk and deer is in the mountains to the east of Yellowstone Park—say from 10 to 30 miles east of the boundary line—or else in the Absaroka Range, which extends southeast from the southeast corner of the Park. These regions can be reached best from Cody, Wyo.

It is illegal for a nonresident of Wyoming to hunt big game without a registered Wyoming guide. Besides you would have great difficulty in finding your way through the rough mountains without a guide, and might spend all your time in country where there was no game. I think that if you will write to the postmaster at Cody, Wyo., he can put you in touch with a guide who will probably charge you less than the guides who advertise largely, and who are the only ones I know the names of. The usual charge for a sportsman hunting in this country is $25 a day, which includes guide, cook, and the necessary pack animals as well as grub.

The Krag rifle will do very well for hunting in Wyoming for either elk or deer—in fact, for any game. But the new D. C. M. cartridges with 172-grain bullet will not do at all. These cartridges will not work through the magazine of the rifle; have to be used loading singly into the chamber as they are too long for the magazine. In addition the filing off of the tips of any full-jacketed bullets is extremely risky business as the core is very liable to shoot through the jacket of the bullet, leaving the jacket in the bore, and the next shot blows up the rifle. I can recommend the Peters make of .30-40 Krag ammunition loaded with 220-grain soft-point bullet as being very satisfactory for hunting, and the most accurate of all the factory loads. But if you want the very best cartridge get the Western make of .303 Savage bullets, weight 190 grains, and hand-load them with a charge of 43 grains' weight of du Pont No. 17½ powder. This is an extremely accurate load with splendid killing power. Your friend's .45-70 rifle will also do very well, subject to the limitations of a single shot and the fact that the high trajectory makes it unsuited for shots much longer than 150 yards, as beyond that range you have to estimate the range almost exactly, and set the sights correctly to make a hit.

As to equipment, I can not do better than to refer you to my book "Wilderness Hunting and Wildcraft," a circular of which I am inclosing, and which has chapters giving full information on all kinds of equipment, as well as on the actual hunting of elk and deer, and all other big game. I think you and your friend will find this bok invaluable if you are going on this hunt. There are many suggestions in it which will help you a lot.

RELOADING FOR THE 1917 FORTY-FIVE

WOULD you advise a load with a lead bullet for the .45-caliber Model 1917 revolver to be used in target work? If so, what powder and how many grains, and what bullet? What reloading tool would you advise and bullet mould?—A. C. T.

Answer (by Major Hatcher). A very good target load for the .45 Model of 1917 is Bond Bullet No. B-454510, weighing 190 grains in the .45 Auto-rim shell loaded with four and seven tenths (4.7) grains of du Pont's Pistol Powder No. 5.

The mould for this bullet is made by the Modern Bond Co., Wilmington, Del.

A very good loading tool is the Straight Line Tool recently described in THE AMERICAN RIFLEMAN by Mr. Naramore.

AN OLD SMITH & WESSON

I HAVE a friend who has a Smith & Wesson .45 Cal. 6-shot revolver that breaks to reload. The following marks are on this revolver: "S. & W. Springfield, Mass.—U. S. Patents—January 17th-24th-1865, July 11th-1865, August-24th 1869, July-25th 1871." On right side of gun, "Schofields Pat-April-22-1873." Number on cylinder, No. 1264, inside of right handle marked 1264. Marked with U. S. on butt of gun.

I would appreciate it very much if you could tell me by return mail if there is any premium offered on this gun.

Answer (by Major Hatcher). The .45-caliber Smith & Wesson Schofield model was adopted in 1873 as the service arm for the United States Army. Quite a few of these guns were bought and issued to the service. Afterwards, when they became obsolete, they were sold to the public.

There are quite a few of them now in use. They use the cartridge known as the ".45 S. & W.," manufactured by all the large cartridge companies.

These guns in good condition are worth perhaps $10.

REMOVING BOLT FROM FRENCH LEBEL

CAN you inform me how to remove the bolt from the receiver of the French Lebel Rifle 8 mm., as was sold by the D. C. M., for cleaning the barrel? I fail to find the combination.—L. S.

Answer (by Colonel Whelen). I have your letter of June 18. You will notice a large lug on the bolt of the Lebel rifle just in rear of the front locking lugs. When the bolt is closed this lug is at the right side of the bolt, and when the bolt is open the lug is on top of the bolt just in front of the bolt-head containing the two locking-lugs. On the top of this lug is the bolt-head-retaining screw.

Turn up the bolt-handle and pull the bolt about halfway to the rear. Unscrew the bolt-head-retaining screw and take it out. Twist the bolt-head with locking-lugs over to the right until the slot in the large lug clears the tenon on the bolt-head. The bolt-head, with its locking-lugs, can then be pulled forward off the bolt proper, and the bolt proper withdrawn to the rear out of the rifle.

BULLETS FOR THE KRAG

I AM sending you in a separate package samples of the new Western Lubaloy soft-point bullets for .303 Savage; also some regular Krag and Winchester .30-30 bullets, so you can compare them. You will notice they all "mike" around .3075. You will also note the thick nose of this Western .303 Savage compared with the Krag. I tried some of these seated same as the sample loaded with 37.5 grains of the W. A. powder—that is in the Krag cartridges—and they work fine. I bought these bullets of W. A. Clark, Colton, N. Y. He claims all the .303 Savage bullets now measure around .308, and that the Savage .303 bullets that measure .311 are "old stock." I think that this would be a dandy deer load in the Krag. Of course, it could be increased, but I don't see the use of the extreme velocity.

I was reading your article in THE AMERICAN RIFLEMAN and noted the loads you gave for .30-'06. Was wondering if the Pyro D. G. could be used with the light 110-grain bullets.

I use the Winchester .30-30 soft-point bullets and 46.5 grains Pyro. D. G.; but it does not show any undue strain. I have had the powder two years and believe it is getting weaker.

The Pyro D. G. does not work good in the Krag, except in 36 grains with 220-grain bullet; and then it will rupture nearly every case reloaded. With the lighter weight bullets it does not burn clean; but the Springfield burns it O. K.

If you have any suggestions or criticisms regarding the seating of these bullets, I would like to hear them. I am ready for anything new in reloading. I let the bullet stick out as far as the original.

I certainly appreciate your articles in THE AMERICAN RIFLEMAN, especially the "Dope Bag."— W. T.

Answer (by Colonel Whelen). I have your letter of June 1, together with the package of Krag cases and bullets. The delay in answering was due to your sending them both to Fort Benning, Ga. I have not been at Fort Benning for over a year.

The .303-190-grain Western bullets are excellent for the Krag rifle. I have been recommending them steadily for general use in this rifle for the past two years. I have a great many letters stating that the accuracy and killing power are fine, and none against the combination. I think that perhaps it is the best target and game load for the Krag that we can get today. Besides W. A. powder, you can also use du Pont No. 17½ powder, and probably get a cooler burning charge, but no better accuracy. W. A. probably will give the best accuracy. The way you load them in the cases, with the same over-rall length as for the regular service cartridge, is all right. So far as I know all of the .303 Savage bullets are now made to measure, about .308 inch. The rifle has a standard groove diameter of .308 inch.

I think that Pyro D. G. can readily be used with the 110-grain Hi-speed bullet in the Springfield and other .30-'06 rifles. I should say that the proper charge would probably be about 50 grains weight. It ought to give a velocity somewhere around 3,000 f. s. Also, if you want a fine little reduced load, try this same bullet in the Springfield with 16 grains du Pont No. 80 powder.

I have not tried these 110-grain bullets in the Krag. It would be interesting to know what accuracy could be obtained. The du Pont leaflet on No. 17½ powder, a copy of which I inclose, gives several charges.

RIFLE-STOCKS

I HAVE reached the point where I am no longer satisfied with the service and commercial rifles unaltered. I think you will agree with me that so far as action and barrel are concerned I couldn't do better than to use a Springfield action with Niedner barrel close-chambered for the .30-'06 cartridge. I believe the Howe-Whelen to be at least 1,000,000 miles ahead of Lyman .48 for a rear sight, so that problem is settled.

The stock gives me considerable worry. I have shot the commercial stock so long, also the service stock, that I may be in no position to tell what kind of a stock I do need. I wish to use the new gun for both target-shooting and hunting. I like a high comb in the offhand position to rest my cheek against.

I have a sporting Springfield which very nearly fills the bill, except that the stock is too short. I have not changed the outline of the Armory P. G. stock at all and of course have left the width of stock at butt-plate the same. I believe that if the stock were lengthened about an inch it would be ideal. I hesitate to order a Circassian-walnut stock before I'm exactly sure what I need, hence this latter. Any help or suggestion will be greatly appreciated.

Also please tell me if I must buy the U. S. rifle, caliber-.22, Model 22, with holes tapped in receiver for Lyman 48? As stated above, the Howe-Whelen is my choice, and I dislike to see a gun disfigured with the unsightly Lyman or Lyman holes. Can you suggest any way of obtaining this rifle without holes. The same question would apply to the stock for both the .22- and the 30-caliber sporter.

In your opinion could Tait, of California, do as good a job of imitating a stock as Hoffman?—G. H. C.

Answer (by Colonel Whelen). I have your letter of September 17. You are right in your assumption that you can not do better for a hunting- or target-rifle, where any form of metallic sight is to be used, than a Springfield action, Niedner barrel, Howe-Whelen rear sight, and a properly fitting stock.

There are just a couple of comments I should like to make. One is that the straight Springfield sporting barrels such as regularly placed on the sporting type of rifle are probably just as good for any purpose as the Niedner barrel. The two barrels are practically equal—no real choice between them. The other is that the Howe-Whelen rear sight is just a little too near the eye for the best work in the military prone position. It was, of course, designed primarily as an accurate hunting sight.

Now about the stock. The Model 1922 Springfield Armory pistol-grip stock as placed on the .22-caliber rifles being made for the N. R. A., and on the sporting .30-caliber rifle was designed primarily for prone target-shooting. I think it has proved itself to be most ideal for this purpose. It seems to fit quite 90 per cent of its users for prone shooting without any change whatever except possibly for length. The great majority of our expert shots prefer to use it without any change whatever. It was made with a perfectly straight surface of wood under the butt-plate with the idea that the owner could cut it off or add a small thickness of walnut or leather under the butt-plate to shorten or lengthen it as desired. Why not try placing one or more thicknesses of leather under the butt-plate until you get it just exactly the length that you wish, and then write the specifications for your new stock around that? It usually happens that whenever a rifleman finds he needs to change the length of this stock he usually wants to shorten it, not lengthen it. This is through the desire to get his eye nearer to the peep of the rear sight, or else to get his hand nearer the bolt-handle, so he can work the bolt more effectively in rapid fire. Probably your desire for a longer stock, if you are not very long-armed, is because you are using the Howe-Whelen rear sight, and in the prone position you want to get your eye just a little farther away from the sight.

This Model 1922 pistol-grip stock is not exactly ideal for a hunting rifle, because it was designed primarily for prone shooting, and in hunting the majority of shooting is done standing, sitting, or kneeling. I think that for a compromise stock, to be used in all positions, and for target-shooting as well as hunting, this stock would be just slightly better if modified so as to have a comb about ⅛ to ¼ inch higher than at present, and with about ¼ to ⅜ inch more drop at the heel, the length of the stock always being that which seems best to fit the individual. Of course I do not know your build, or, what is more important, your firing positions and particular manner of holding, but the above has been my experience based on the average native-born American of from 5 feet 6 inches to 6 feet tall.

All the stocks I have seen by Tait were most excellent, good stocks, plenty good enough for any purpose, but they were not in quite the same class as those made by Hoffman, Griffin & Howe, or Owen. These three firms make the very best stocks in America, if not in the world. But the Tait stock is a fine stock, plenty good enough, and is most decidedly all right particularly if one wishes to economize a little.

Regarding the screw-holes for Lyman No. 48 rear sight in Springfield receivers. Springfield is organized entirely on a quantity production basis. They make their receivers at certain periodical times in very large lots, all by machinery, and all in exact accordance with specifications. All of the .22-caliber receivers are made with these screw-holes in them. All of the sporting rifles are also assembled with receivers with these holes drilled. To have a .22 receiver made to special order and out of the routine without these holes would cost like the very devil, as also would the special assembly of a sporting rifle with receiver without the holes drilled in it. But a good gunsmith could insert headless screws in these holes, pene the heads so that they joined up with the surface of the receiver metal, and then blue over in such a manner that you would never know that the holes were there. I am not at all sure that Springfield would agree to make receivers without these holes anyhow at any price, on account of the disruption of the factory for custom work which they are not prepared to do.

POWDER CHARGES FOR 180- AND 220-GRAIN BULLETS IN .30-'06

AS a member of the N. R. A., I am taking the liberty of asking if you would advise the weight of charge and type of powder used by the Western Cartridge Co. to obtain the velocities advertised for their .30-'06 Government cartridge, loaded with a 180-grain boat-tail Lubaloy bullet.

May I also have the same figures for the 220-grain boat-tail?—M. G. L.

Answer (by Colonel Whelen). I do not know the exact charges which the Western Cartridge Co. use with their .30 Government cartridge loaded with 180- and 220-grain boat-tail bullets. However, this information would not do you any good, for the reason that all of the cartridge companies use certain lots of powder which are not sold to individuals, which lots have a rate of burning which differs from the lots of powder that the individual can purchase.

To explain a little further: Every lot of du Pont No. 15½ or 17½ powder which the du Pont company makes has a slightly different rate of burning, and therefore requires a slightly different charge to give certain velocity and pressure. This makes no difference to the cartridge companies, because they control their pressure and velocity with chronograph and pressure gun. A certain lot of these powders has been selected by the du Pont company as the canister lot, and this particular lot is the lot which is sold to individuals. Charges have been determined with it for various bullets and in various calibers. If you were to break open a cartridge that was loaded by a cartridge company and identify the kind of powder in it and weigh the powder charge, and then if you were to endeavor to duplicate this load, using the canister lot of powder which is sold to individuals, you would probably get very different results from the factory cartridge and you might run into high pressures.

Using the canister lots of powder which the du Pont company sells to individuals, the following are the charges which most nearly approximate the ballistics of the Western Cartridge Co. standard factory ammunition: 180-grain Western boat-tail bullet, 54 grains du Pont 15½ powder, muzzle velocity 2,750 f. s.; 220-grain Western boat-tail bullet, 46.8 grains du Pont 17½ powder, M. V. 2,375 f. s.

BY ALL MEANS RELOAD

I AM having an N. M. Springfield rebuilt into a sporting rifle with telescope mounted by Griffin & Howe. It is costing quite a sum of money and no doubt will be a fine rifle. I am anxious to try reloading my own shells, but am a little afraid I might ruin the barrel in learning the game. Do you consider it practical to reload the .30-'06 ammunition? It seems to me that one could reload their ammunition for about half what it costs retail, and I am sure it would be a good amusement for me.

I will appreciate it very much if you will give me a list of the tools that you would recommend as necessary for reloading the above cases, and also the name of the firm that makes the best tool for each part of the reloading, in case you consider some of different makes handier for certain parts of the operation.—K. S. D.

Answer (by Colonel Whelen). The reloading of almost all rifle-cartridges, including .30-'06 caliber, is entirely practical. It is being done every day in this country by thousands of riflemen and sportsmen with perfect satisfaction. If one will give only a little study to the subject he can master it so that he can turn out reloaded ammunition that is fully the equal of the factory products, and in some cases even better than factory cartridges. He can also load special cartridges for particular purposes which the factories do not furnish, particularly cartridges for small-game shooting and cheap target practice in high-power rifles.

I should strongly advise your obtaining a copy of Mr. Mattern's new book "Handloading Ammunition," sold by the Small Arms Technical Publishing Co., Marshallton, Del. (price $3 post paid), and also a copy of the "Ideal Handbook," from the Lyman Gun Sight Corporation, Middlefield, Conn. Price, 50 cents post paid. These two books will give you entire and complete information on the whole subject, and are worth their weight in gold to the reloader.

The principal makers of reloading tools are the Lyman Gun Sight Corporation, Middlefield, Conn., the Modern Bond Corporation, Wilmington, Del., and Belding & Mull, Inc., Philipsburg, Pa. All of these make a full line of reloading tools, and all of their tools are first rate in every respect, there being practically no choice between them.

You need for reloading with ready-made bullets the tools listed below. I am not here considering the making or casting of bullets, which is a little too long a story to publish here, and which will be found fully set forth in the above books. The following tools will be absolutely necessary to successful reloading.

A reloading tool, for the .30-'06 Springfield cartridge, fully equipped with double adjustable chamber without crimp, with bullet seater to seat pointed bullets (will also seat round-nose bullets satisfactorily) and a muzzle-resizing die to resize case-necks the proper size to hold jacketed bullets friction tight. A powder-measure, either the Ideal No. 5 or the Bond. A Fairbanks powder-scales. Two battery jars and the necessary chemicals for the cleaning of empty cartridge-cases. Everything else can be extemporized at home.

You will of course also need components, and in this connection it will be distinctly to your advantage to become a member of the N. R. A. (if you are not already a member) as you can purchase many components through the D. C. M. much more cheaply than elsewhere. For example, it is well to start out with a first-rate lot of empty cartridge-cases (although you can readily use any of your fired cases of any make for reloading), and you can get from the D. C. M. 100 empty, not primed cases, .30-'06, and a supply of F. A. No. 70 rifle-primers. It would also be advisable at the same time to order a supply of the 150-grain full-jacketed pointed .30-'06 bullets, which are fine for small-game or short-range practice as will be explained below. Your powder, as indicated below, can best be obtained through your nearest sporting-goods store who will order it for you from the nearest du Pont distributing magazine. Your expanding sporting bullets you can obtain best either direct from the cartridge companies, or the makers of reloading tools usually carry a supply of those noted below on hand.

The operations are very simple. First you decap the fired cases. Then you wash and dry these cases as described in "Handloading Ammunition." Next you slightly chamfer the sharp edge from the mouth of the case, resize the neck of the case and prime it with a new primer. Then you set your powder-measure, using the Fairbanks scale to be absolutely sure that it is set to throw exactly the right weight of powder (it can not really be set accurately otherwise), and then you throw the required charge in each case you are reloading. Afterwards the reloading operation is completed by seating the bullets in these powder-filled cases to the required depth. There are a few little kinks here and there which are fully explained in "Handloading Ammunition."

The cleaning and drying of the empty cases is the only messy job, and that is not at all hard once a man has done it. The other operations can be done anywhere, and one can readily perform all the operations of reloading two to four hundred cartridges in a spare evening.

For use in a Sporting Springfield rifle I should advise the following loads as being the most useful and perhaps the most suitable for all uses:

For all general hunting of American big game: The 180-grain open-point boat-tail Lubaloy jacketed bullet made by the Western Cartridge Co., with a powder charge of 48 grains' weight of du Pont I. M. R. No. 17½ powder; muzzle velocity 2,600 f. s.

For African lion, moose, and Alaskan brown bear the following charge may be just a little bit better than the preceding one: The 220-grain soft-point boat-tail Lubaloy jacketed bullet made by the Western Cartridge Co., with a powder charge of 46 grains' weight of du Pont I. M. R. No. 17½ powder; muzzle velocity 2,300 f. s.

For woodchucks and coyotes, and perhaps for jack-rabbits if you do not object to blowing the rabbits to pieces: The 110-grain .30-'06 Hi-speed bullet made by the Remington Arms Co., with a powder charge of 50 grains' weight of du Pont No. 17½ powder; muzzle velocity 3,000 f. s.

For small game, such as grouse, otter, beaver, or rabbit, where you do not wish to spoil either meat or pelt, and for cheap and extremely accurate target practice up to 200 yards, with light report and little recoil: The 150-grain .30-'06 old service bullet, pointed, full-jacketed, which members of the N. R. A. can obtain through the D. C. M. at $8.90 per thousand, with a powder charge of 18 grains' weight of du Pont S. R. No. 80 powder; muzzle velocity 1,500 f. s.

The above loads are all time tried, extremely accurate, safe, and reliable, and they do not give any metal-fouling, nor do they excessively erode the barrel.

I think that the above information, together with that contained in Mr. Mattern's book on "Handloading Ammunition," will set you straight at the start. I should strongly advise you to take up reloading. You will find it extremely satisfactory and interesting, and you do not have to reload many hundreds of rounds before you have saved the cost of your tools, and after that, as you can readily calculate from the price of components, there is a very great saving in it.

YOU JUST CAN'T TELL

I AM about to build a pistol. I have decided on a 14-inch barrel for .22 caliber L.R. The question is, what length of barrel would be considered as out of concealed weapon class? I believe California puts it at 12 inches, any caliber. Is this right? But the above will be considered in all States in U. S. Also, the above will be fitted with peep sights.

This gun is to be used only for target practice, being a single shot.—H. D.

Answer (by Major Hatcher). In many States the pistol class is anything with a barrel less than 12 inches long. Some makers of one-hand shotguns make them 12¼ inches long in order to be outside this limit.

I do not know, however, whether this is the case in every State, as it is very hard to keep up with all changes and amendments to laws that are constantly going through.

RIFLE FOR SOUTH AMERICA

I HAVE been planning on a tour of South America, and would like some information on guns. For a pistol I have decided on the Colt .45 Automatic, but have little idea as to the best all-around rifle that would be suitable for big game. Personally I am in favor of a Remington gun, but don't know what caliber to choose. Please send me some information on this. I would like also to have you recommend some books on big-game hunting and also on the camping equipment necessary.—D. C. E.

Answer (by Colonel Whelen). South America, of course, is a pretty big continent with many extremes of climate and conditions from the most humid and densely wooded tropics to antarctic cold and ice. In the matter of the selection of the rifle, however, we have a simple problem because practically all of the rifle game of the continent is contained in the tropical belt; none of it is, strictly speaking, dangerous or at all difficult to kill. Three features stand out as desirable in a rifle for South America. The rifle itself should be light and its ammunition should be light, for a heavy rifle and heavy ammunition is tiring to carry in tropical heat. The rifle should be capable of using either light loads with which small animals and birds may be shot for either collecting or the table, or a heavy load for the large game, such as deer and tapir. In the tropics the rifle will be bathed inside and out all day long with either rain or sweat, and it is highly desirable that the breech-action be so constructed that it can be taken apart completely by hand, wiped off, and oiled, at the end of the day's work.

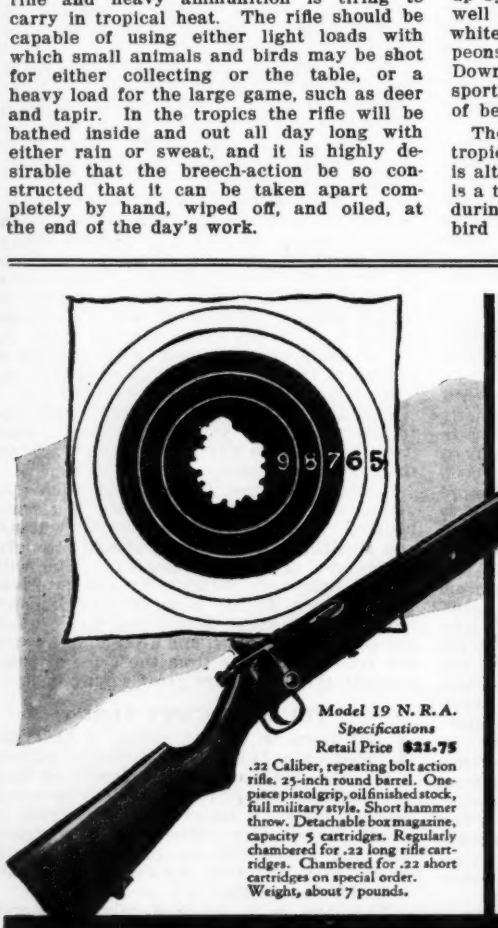
There is no rifle which fulfills these conditions so completely as the Remington Model 30 Express Rifle in .25-caliber Remington Rimless caliber. It is the ideal rifle for Central or South America. A reduced load for small game is not regularly marketed for it. Please see Mr. Mattern's new book, "Handloading Ammunition," which gives a number of most excellent reduced loads for this rifle and gives complete directions for their loading.

With regard to big-game hunting and camping equipment, you need some background. I would suggest my book, "American Wilderness Hunting and Wildcraft," and "Camping and Woodcraft," by Horace Kephart, both of which can be supplied by the Small Arms Technical Publishing Co. While these deal more specifically with North than with South America, they give principles which are good in any country.

The highlands of the Andes on the western coast will not differ much from our own southern Rocky Mountains, hot in the daytime, but cold at night, except for the absence of wood for tent poles, and often wood for fuel. In the cities of these regions it is well to remember that you are sized up by your clothes, and that if you are not well dressed, and if you do not wear a white collar, you are classed with the peons. Read Harry Frank's "Vagabonding Down The Andes." There is not much sport to be had in these regions, but much of beauty in the way of scenery.

The jungle of the Amazon and of all the tropical rivers which flow into the Atlantic is altogether different. For the most part it is a thick forest, rather flat, often inundated during the rainy seasons, full of animal and bird life, mostly small animals—agouti, paca, sloth, peccary, opossum, ant bear, coati-mundi, tapir, and the evasive jaguar, which you probably will not see. There are a great many varieties of birds, many of them most welcome on the table. Here and there are deer, mostly in the opener portions than in the thick forest, but these are all small, and their heads are not much in the way of trophies. It is more a region for a naturalist and a lover of nature than for a hunter. In this tropical region the camp equipment and camping expedients had best be quite different from what we are used to in this country. The natives (whites) do not do much camping, but aim where possible to stop where there as a palm-leafed thatch. Such places harbor malaria mosquitoes. It is by far the best for Americans who are used to camping to always go at least a mile from any native habitation, new or old, before camping in the jungle away from mosquito-proof houses. The Anopheles mosquito flies only at night, and seldom gets a mile from where she is born. She, for the female of the species only is dangerous, must bite a person suffering with malaria and then bite you to infect you. It follows that if you camp away from the natives you will not be infected.

The South American is very partial to the hammock-bed. This is because he seldom camps away from a shack, the supporting posts of which serve to tie the hammock to. But in the jungle, trees do not often grow at a convenient distance apart to tie a hammock to, and it is difficult to arrange adequate rain shelter and mosquito bar above a hammock. Decidedly the best arrangement for the camp of an American in the jungle is a wall tent, with the sides and ends made entirely of mosquito netting,



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and with a ground cloth. A closed tent is an impossibility in this country—too hot even at night. D. T. Abercrombie, 311 Broadway, New York, shows a good model in his catalogue of camp equipment. On the floor for your bed the best is a light air mattress, 30 inches by 48 inches, with a very light blanket, and an air pillow.

A machete is usually more useful than ax. Take both, but cut the blade of the machete off to not over 15 inches long, making it much handier to both wield and carry, and have a stout sheath made for it. Have rubber tobacco pouches for everything that you want to keep dry in your pockets. Have your compass waterproof. Carry a Marble Game Getter Gun rather than a revolver or an automatic pistol. You will have constant use for the Game Getter, and you will never have any use for the revolver or pistol.

I do not know of much literature that will be of help to you in South America. A man who is a woodsman will get along well there, quickly adapting himself to the local conditions. The main thing is to take care of one's health, keeping protected from infected mosquitoes, keeping the skin healthy by bathing and clean clothes, and always using iodine at once on all abrasions of the skin.

SHOTGUN-BARRELS AND PRESSURES

IN A Winchester Pump, 20-gauge, to be used strictly as a quail and rabbit gun in California, what choke and length of barrel do you recommend?

Also, what happened to the twist and Damascus steel barrels? Were they found to be too soft for our present chilled shot, or were they too expensive to manufacture?—A. V.

Answer (by Captain Askins). I think California quail would have to be taken at a bit longer range than Bob Whites in the East; therefore 28-inch barrels, modified choke, for that 20-bore.

The twist and Damascus barrels were inferior to compressed steel both in tensile strength and in wearing qualities. Such barrels might be expanded under present pressures, though they were pretty hard to burst. Additionally such barrels were no doubt slower and more expensive to make. Present shotgun-barrels should withstand a pressure of 15,000 pounds, though they never should be shot with a breech pressure exceeding about half of that and normal pressures are around four tons.

WAD RAISES PRESSURE

QUESTION 1. Two straight cartridge cases (say 38 S. & W. Special) are both loaded alike with same size bullets, and same weight of smokeless powder (say Pistol Powder No. 5). The air space in case is relatively large and is the same in both cartridge cases. In one cartridge a thin cardboard was is inserted lightly, holding the powder in base of shell instead of loose throughout air space, and the bullet in this shell is seated less deeply by an amount equal to the thickness of the cardboard wad. What effect would the wad have on breech pressure and why?

Question 2. Will you please recommend a Gallery Smokeless load for Round Ball in 38 S. & W. Special?

Question 3. Can wads be used over Schuetzen Powder, then round ball, then lubricant to seal ball in case?—W. L. S.

Answer (by Major Hatcher). The breech pressure in the cartridge having the cardboard wad will be somewhat higher than that in the other one. The reason is that the powder is held up against the primer where it can be more thoroughly ignited by the primer flash. I do not think this would cause any unduly high pressure however. 2. Use 000 Buck Eastern size with 3 grains of du Pont bulk shotgun powder. 3. Yes.

STOCK FOR TRAP-GUNS

I AM making a stock for a Winchester Auto-loading shotgun, and would like to know the correct length and drop. I use this gun for trap-shooting, and have found that the factory stock is too short and has too much drop. I am 5 feet 8½ inches tall, weigh 140 pounds, and have rather long arms.—J. P. S.

Answer (by Captain Askins). I'd think the Winchester trap modified 12 would be about right in stock; stock 14 inches long, drop at comb 1½ inches, at butt 1¾ inches. If you think you need a longer stock, then 14¼ inches. 1⅜ inches at comb by 2 inches at butt. The longer the stock the lower the comb would appear to be, because of the face coming in contact with it farther back. If I were making that stock myself I'd try it as I went along before finishing—say begin trying it when the comb is an inch high and the butt 1½-inch drop, and then gradually working down until it felt right.

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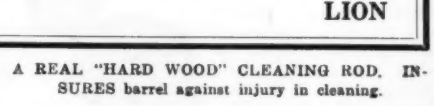

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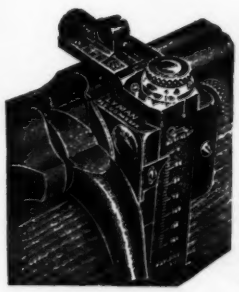

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No Rusting, No Pitting—All the Old Dependability

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Primed with the new non-corrosive Winchester priming mixture, Winchester Staynless Cartridges not only free the shooter from fear of rust and pitting but assure him, at the same time, of dependable hit-where-you-aim ammunition.

This patiently worked out Winchester priming formula has been tested and retested. It has been proved with the world-known Winchester exactitude. With the determination that none of the famous Winchester ballistic excellence should be sacrificed to secure the desired freedom from rust, Winchester experts have produced a non-corrosive cartridge that can be offered to sportsmen with the promise—

"Everything of the old Winchester cartridge PLUS positive freedom from rusting and pitting."

Winchester Staynless Cartridges are made in .22 Short, Long and Long Rifle, both solid and hollow point bullet.

For accuracy and sure-fire dependability PLUS freedom from rusting and pitting, insist on Winchester Staynless.

WINCHESTER REPEATING ARMS CO., New Haven, Conn., U. S. A.

The NEW WINCHESTER
TRADE MARK
STAYNLESS
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Be sure you get the distinctive dark blue, red and white box.

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